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THE

# MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—11TH YEAR. SYDNEY: SATURDAY, MAY 24, 1924. No. 21.


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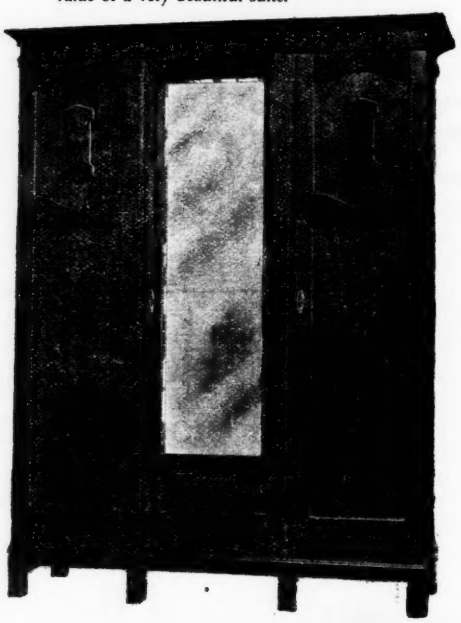

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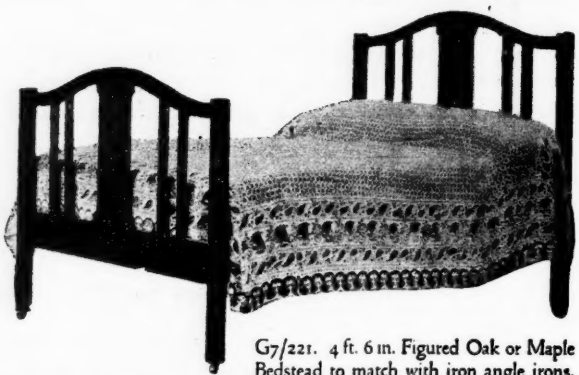

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## ETHER AND ETHYL CHLORIDE.[1]

By A. P. MURPHY, M.C., M.B., Ch.M. (Sydney),
*Honorary Assistant Physician, Brisbane Hospital.*

### Ether.

THE history of the introduction of ether as an anæsthetic is not very clear, but there is no doubt that the credit for the practical application of the principle belongs to America. About the year 1842 Long first administered the vapour for a surgical operation and in 1846 operations under ether were performed in London.

*Ether purificatus*, as used for the production of general anæsthesia, is formed by the action of sulphuric acid on absolute alcohol. It should have a specific gravity of not less than 0.720 nor more than 0.735, should evaporate from a white surface without leaving colour or odour and should be neutral to litmus. The vapour is two and a half times as heavy as air and so the bulk tends to fall downwards, but it diffuses or mixes rather readily with the atmosphere. It is highly inflammable and if mixed with air explosive, hence it cannot be used with the cautery or diathermy knife and a naked light should not be exposed in its vicinity.

Two methods of administration are in vogue, namely the closed and the open.

The former has the advantage of economy, regulation of the strength of the vapour and prevention of impregnation of the surrounding atmosphere. Its disadvantages are greater liability to lividity, increased flow of mucus and I believe it is productive of more post-anæsthetic vomiting.

The open method is the one most commonly used and apart from the question of economy has much in its favour. There is but slight tendency to lividity and secretion of mucus and post-anæsthetic vomiting are reduced to a minimum, in fact the only contra-indication to its employment is an acute or chronic disease of the organs of respiration.

The old-time bogey "bad heart" by which valvular disease or cardiac irregularity was usually implied, has long since lost its terrors and many irregularities temporarily disappear in an anæsthetized patient, while valvular disease rarely precludes the use of ether.

With regard to the time a patient may be kept anæsthetized there is naturally wide divergence of opinion and every case must be judged on its merits. A severely shocked patient must be got off the table in the minimum of time and people emaciated by

[1] Read at a meeting of the Queensland Branch of the British Medical Association on April 4, 1924.

wasting disease will not stand an anæsthetic of indefinite duration. But in the good average "surgical risk" time is of minor importance. Personally the longest period I have been called upon to keep a patient under is three hours and twenty minutes and, while acting as anæsthetist to a surgeon not noted for speed, I have frequently given ether for three hours without any ill-effects.

And now a few words with regard to the actual administration. I do not propose to deal step by step with the various stages, but merely to lay stress on points of importance.

In respect to preliminary medication a hypodermic injection of 0.01 gramme or 0.007 gramme (one-sixth or one-eighth grain) or morphine combined with 0.0006 gramme (1/100 grain) of atropine is in most cases beneficial. It lessens the patient's nervousness, permits of a quieter induction, diminishes secretion of mucus and lessens post-anæsthetic vomiting. One fact has been strongly urged against the use of morphine, namely the resulting contraction of the pupil, but with ether the anæsthetist should learn to rely on the breathing and colour of the patient and with a little experience the depth of anæsthesia can usually be judged by the breathing alone.

Often during the induction stage the patient voluntarily holds his breath or indulges in a slight ether spasm with a certain amount of trismus. It is better in these circumstances not to remove the mask. Cease the administration in order to avoid too great a concentration of vapour when the patient takes the next breath, push the jaw well forward and wait. Cyanosis may become marked, but in the majority of cases respiration is resumed after a brief interval and full anæsthesia is then rapidly produced.

Discretion should be used in respect to the depth of anæsthesia. Operations on the upper portion of the abdomen require the deepest degree, while for those conducted in the pelvis and on the extremities a much lighter grade suffices.

The two main factors in the administration of ether are the maintenance of a clear air-way and an even depth of anæsthesia. The former can usually be accomplished by keeping the jaw well forward, but in certain people, particularly short-necked, thick-set heavy-smoking males, this is not effective. In these cases a Hewitt artificial air-way is most useful and dispenses with tongue forceps and sutures.

The latter, namely even depth, is the essence of good administration of an anæsthetic, for if it is maintained there is little need for anxiety on the part of anæsthetist or surgeon and very few undesirable after effects are manifested. On the other hand if the anæsthesia is alternately too light and too deep, both anæsthetist and surgeon are harassed, their efficiency is reduced, while the patient's protest usually takes the form of prolonged and distressing post-operative vomiting.

Ether produces a slow and steady fall in blood pressure, hence it should be the anæsthetic chosen for patients with any degree of arterial hypertension. It is claimed that a sudden rapid drop in pressure precedes the onset of shock and that by watching for this some ten or fifteen minutes' warning of the approach of this grave condition may be obtained, hence in America it seems usual to affix a sphygmomanometer to the patient's arm and to take frequent readings during the administration of the anæsthetic, but, while this may be a valuable precaution in a few cases, it is quite unnecessary in the great majority.

Fatalities are from time to time recorded, but it is doubtful if the anæsthetic itself is directly to blame. Death is due to overdosage, desperate condition of the patient or severity of the necessary surgical interference.

Taken all round, with due care and reasonable precautions, ether given by the open or closed method is a very safe anæsthetic and meets all requirements in almost every case.

### Ethyl Chloride.

Ethyl chloride is one of the most rapidly acting and powerful anæsthetics known and has the reputation of being dangerous. This reputation is rather undeserved, as the fault, if fault there be, can usually be laid at the door of the administrator, not of the anæsthetic itself.

It is most useful in minor operations requiring anæsthesia of brief duration, its after effects are transient and mild when compared with those of ether and chloroform and the induction is very rapid.

A certain degree of muscular rigidity is usually present and in operations on the throat and mouth it is advisable to insert a gag between the teeth before induction.

It carries a marked period of analgesia in its train which enables manipulations to be carried out when the patient is apparently coming to, without any recollection on his part after consciousness is regained.

Ethyl chloride may be given by the closed method by spraying three cubic centimetres to five cubic centimetres into a closed inhaler and proceeding as with ether, but it is safer and more pleasant when administered by the open method, which is as follows: On to the ordinary mask enclosed in a towel or suitable bandage about ten cubic centimetres are rapidly delivered and the patient instructed to breathe deeply. In thirty seconds or even less consciousness is lost and stertor usually developes within a minute. On reaching this stage if the mask be removed, anæsthesia of about sixty seconds' duration is obtained, but if a longer period is desired the mask is left *in situ* and a few more cubic centimetres sprayed on. By these means anæsthesia may be prolonged to three minutes or more, but if this time is not sufficient for the operator it is better to continue with a little ether.

Few people who have once taken ethyl chloride object to it on subsequent occasions and it makes a very pleasant induction to ether. The crux of this sequence lies in getting a sufficient concentration of ether vapour on the mask and in the patient's circu-

lation before the effects of the ethyl chloride have passed off, but a little practice makes this a comparatively easy matter.

Deaths have been recorded, but if sufficient air be admitted with the vapour, as must take place when the open method is employed, the greatest element of danger is eliminated and it may be administered with confidence.

In conclusion I wish to point out that this paper does not pretend to be a treatise on ether or ethyl chloride, but is merely an enumeration of certain points in their administration which will, I trust, provide sufficient grounds for criticism and discussion.

## CHLOROFORM AND REGIONAL ANÆSTHESIA.[1]

By C. A. THELANDER, M.B., Ch.M. (Edin.),
*Honorary Surgeon, Lady Lamington Hospital, Brisbane.*

### Chloroform.

I TAKE it that the meeting does not desire a lecture on methods of administration of chloroform nor statistical references nor reports of my cases, but rather, as far as I can give it, a statement of the case for the use of chloroform at the present day.

Let us consider the parable of the vermiform appendix. If a suspicion against its validity has been raised by any medical practitioner, chemist, relative, herbalist or other influential citizen, and you venture the opinion that there is nothing wrong with the appendix, you might as well realize that if anything happens to that member within the next five years you will be held culpable.

In the same way any man who dares to administer chloroform has to pledge his reputation that there will be no death on the table, such is the force of current public opinion. If a death occurs under ether the inquiry is more or less formal; obviously the anæsthetist cannot be blamed, he was using the right stuff, it must have been the patient's fault.

And yet a great deal of chloroform is used in this State and throughout the world. There must be a "case" for its use.

The most obvious indication is of course obstetrical. Nowadays it seems to be the duty of an instructor in anæsthesia to design or to modify some apparatus for the foolproof administration of ether and to instil a chloroform phobia into his pupils and the public, but I think no one has yet succeeded in persuading either the obstetrician or his patient to abandon chloroform for ether. I have used ether in such a patient once when I had spilt my chloroform and I was very glad she was a *multipara* and that the head was on the perineum before I began. Chloroform offers what may be termed a flexibility of anæsthesia which is so peculiarly suitable in obstetrics that it holds the field.

Take again the alcoholic and muscular artisan. In one such patient on whom I operated, the anæsthetist using ether with a Clover's inhaler failed to induce sufficient anæsthesia for operation. After fully half an hour he had to use chloroform. This was a competent anæsthetist, highly reputed for that work among his professional colleagues. The patient had had morphine.

Suppose this to have been in the West, with a shade temperature of one hundred and ten or higher and for either accident or operation the superiority of chloroform would be unquestionable.

In cleft palate operations on babies when the anæsthetist would not risk ether given by the nasal tube, chloroform is almost a necessity. For repeated administrations in the case of painful dressings I much prefer chloroform; its advantage in bronchitics is admitted and in some neurotics it is the only anæsthetic possible unless the patient is fortified by heavy pre-narcosis.

In orthopædics Calot in his fascinating book advises: "If you are accustomed to ether, keep to it; if not, I advise you to prefer chloroform." In the use of diathermy chloroform is undoubtedly the better anæsthetic.

Considerations like these which can be multiplied indefinitely, assure us that in general practice chloroform is not to be displaced by ether. Let us consider the public and the professional fear in relation to its use.

Statistical comparisons have always been against chloroform. Quite unfairly so in my opinion for several reasons.

Most of the pioneer work in anæsthesia was done with chloroform and when we consider how much had to be learned as to the purity of drugs and the recognition of danger signs in the patient before and during anæsthesia, it seems unfair to compare statistics further back in time than about ten years.

The deaths attributed to chloroform fall into two groups, the immediate and the so-called delayed chloroform poisoning. The latter is seldom heard of now; it was a relatively frequent diagnosis fifteen or twenty years ago and was probably due chiefly to impurities or decomposition products and recent studies on acidosis indicate that chloroform was often wrongly blamed.

Deaths on the table have been and still are too frequent. The pharmacologist tells us that they can occur in two ways: Vagus irritation during induction and overdosage. Against the former atropine is a reliable preventive, according to Professor Schafer; against the latter there is no preventive but brains. That chloroform can be safely administered is attested by the findings of the British Medical Association Commission of 1902. A vapour concentration of 2% was found sufficient for induction and anæsthesia can be safely maintained at that or less. Various forms of apparatus have been designed to secure the proper concentration of chloroform vapour and each is efficient in the hands of the man who accustoms himself to the use of it; but none is safe in the hands of him who cannot keep an interested watch on his patient while he is apparently taking the anæsthetic well. In this respect ether offers a wider safety margin and for

[1] Read at a meeting of the Queensland Branch of the British Medical Association on April 4, 1924.

operations in suitably equipped theatres and with suitable pre-narcosis presents an irresistible attraction to the anæsthetist, for it is the death on the table that he dreads most of all. If well administered, ether in such cases shows no inferiority to chloroform. If badly taken by the patient there is no immediate disaster and if, as I believe frequently occurs, it is a potent factor in post-operative mortality, the anæsthetist is by that time well in the background. The chief danger of ether is from its effect on the bronchi and lungs and there are no statistics which do justice in this respect.

Whatever our ultimate opinion on this question may be, there is no one who has the courage to go into general practice in the country without chloroform. Your anæsthetic instructors know this and yet I have met many graduates who have never administered chloroform nor even seen it given.

To come to personal experience, I am prepared to administer chloroform, realizing the public prejudice and the responsibility arising therefrom, to any patient adjudged suitable for general anæsthesia. For the induction I have rarely used anything else; my practice has been to continue with chloroform or with ether and chloroform on the open Schimmelbusch mask. This is covered with a a huck-a-back towel and requires no "turban" nor other drapery. It is many years since I have used the corneal reflex as a guide in anæsthesia. It is not safe, for it gives no information of any value after induction, and during induction it may distract attention from the heart. The pulse (best felt in the carotid just below the hyoid bone), the breathing, including the voice, the pupils (often disturbed by morphine and atropine) and any voluntary muscles in view, give all the information required and if you cannot bear them all in mind, you cannot administer chloroform safely. Slow induction is not necessary nor desirable. Using chloroform alone I have anæsthetized sufficiently for the extraction of about a dozen teeth and had the patient walk quietly from the chair seven minutes from the time the mask was first applied. Even in these days, when I rarely give anæsthetics at all, I cannot cultivate the chloroform phobia.

To summarize, it may be stated that but for the alleged danger attending its use chloroform would be admitted by all to be the best general anæsthetic in use at the present day. By danger is implied danger of death on the table, for there is no evidence that its delayed effects are more pernicious or even as much so, as those of ether—the only valid rival of chloroform for general use. There are fewer practitioners competent to give chloroform than ether, but in the hands of such it is as safe as ether, much more pleasant to take and leaves less post-anæsthetic illness. It can be used in every patient who is fit for general anæsthesia, and it is efficient in many patients when ether is useless or worse. There is no justification for the attitude of a teacher whose only doctrine as to chloroform is to teach his class to avoid its use. If as much time and effort were expended in teaching the technique of chloroform administration as are occupied in warning against its employment, there would be fewer fatalities from its unskilful use. Finally, until a much better substitute than ether is introduced, chloroform will occupy its present field.

I have no apparatus to demonstrate, but I understand Dr. Graham Brown has a new form of chloroform inhaler to show the meeting. It will serve to indicate that the study is not yet abandoned.

### Regional Anæsthesia.

It was in a very absent-minded moment that I allowed my name to be associated with the subject of regional anæsthesia. Except in the methods of local infiltration and of spinal anæsthesia I have never used local anæsthetics. My experience is very limited and is confined to cocaine, $\beta$ eucaine, and "Novocain," of which I much prefer the last. The mistake usually made with it is not to use enough. But I have nothing on the subject worthy of presenting to this meeting.

## THE INTRA-TRACHEAL METHOD OF ETHER ANÆSTHESIA.[1]

By R. E. WEAVER, M.B., Ch.M. (Sydney),
*Honorary Assistant Physician, Mater Misericordiæ Hospital, South Brisbane.*

### Introduction.

IN recent years the practice of surgery has made wonderful strides, but following closely in its wake with a lesser flourish of trumpets is modern anæsthesia.

In his advance along the path of efficiency the surgeon has had many times to stop to solicit aid from his indispensable ally the anæsthetist. Nor has he asked in vain, for there have been placed at his disposal various alternative methods of producing anæsthesia and although there is no single method capable of general application to all cases, it is safe to say that there is today a suitable anæsthetic for every operation in surgery, however special it may be.

Perhaps the most modern method now in vogue is intra-tracheal anæsthesia or intra-tracheal insufflation and it is on this subject I would like to address to you a few remarks tonight.

### The Principle of Intra-Tracheal Anæsthesia.

The principle of the intra-tracheal method of producing anæsthesia is to deliver at the bifurcation of the trachea a continuous current of air laden with sufficient ether vapour to maintain anæsthesia. This is done by passing through the larynx and down to the bifurcation of the trachea a smooth catheter connected at its external end with an apparatus for pumping air through a chamber where it takes up ether. A number 14 or 15 Belfast linen catheter is the most suitable for this purpose.

### Apparatus and Methods.

The original work on this principle was done by Meltzer and Auer and Elsberg turned their dis-

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coveries to account in human beings. Kelly introduced the method in England.

Many varieties of apparatus have been devised to carry out this method of anæsthesia. Of the more popular ones I have read, but have never seen used, the only one of which I have had any experience and purpose to speak tonight is the machine invented by Dr. Lidwill, of Sydney. I have had the opportunity of using it frequently, both in hospital and private practice with good results.

The machine has been ably described and demonstrated by its inventor and is no doubt familiar to you all. Briefly it consists of a motor and rheostat attached to blower with an air-ether regulating chamber, reservoir and mercurial manometer and electric heating apparatus. It allows the administration of ether by the oral intra-pharyngeal or intra-tracheal routes.

### Conduct of Anæsthesia.

After a preliminary injection of morphine 0.01 gramme (grain one-sixth) and atropine 0.0006 gramme (grain 1/100) about half an hour before the operation the patient is anæsthetized in the ordinary way.

It is important to carry the anæsthesia to the complete relaxation of the masseter muscles. This greatly facilitates the passage of the catheter by doing away with the mouth gag and tongue clip.

The laryngoscope is now passed into the mouth and on to the pharynx and the epiglottis sought. The laryngoscope is then pushed onwards for about 0.6 centimetre (a quarter of an inch) and pressed firmly against the anterior pharyngeal wall. This generally brings the glottis into view. In deep anæsthesia the cords will be widely abducted and the catheter is easily passed through and on down to the bifurcation. This constitutes the main difficulty of technique and is after all only a piece of sleight-of-hand acquired and perfected by practice. The catheter is then connected to the machine. Usually the passage of the catheter produces a hoarse reflex cough.

Subsequent conduct of the anæsthesia consists mainly in watching that the catheter is not disturbed by the manipulations of the surgeon or the ministerings of the assistant or nurse and in getting the patient to the desired depth of anæsthesia by means of the air-ether regulating chamber. Once this is reached no further adjustments are required. The patient will be receiving a definite percentage of ether, consequently there will be no alternation in the depth of the anæsthesia.

Shortly before the close of the operation pure air is allowed to pass down the catheter. This can be continued as long as necessary.

Should the oral method be required it is only necessary to connect a tube from the machine into an artificial airway which is introduced into the mouth.

Similarly for the intra-pharyngeal method the technique consists in passing two soft rubber catheters down the nostrils for about ten centimetres (four inches) connecting these to a naso-pharyngeal tube which is connected with the machine.

### Advantages and Indications.

It is now generally agreed that for operations within or about the mouth, nose, pharynx or larynx, requiring a general anæsthetic the intra-tracheal administration of ether is the method of election.

Its advantage is at once obvious to you all. It preserves for the surgeon a clear field for his work which he can complete without any unnecessary hurry and without being disturbed in his concentration and temper by the patient coming out half-way through the operation. Of greater importance still is the fact that there is greater safety to the patient, because he can be placed in any posture by the surgeon without fear of the airway being choked up with blood or any other secretion.

The return current of air along the sides of the catheter sweeps before it any blood or mucus that may have trickled into the trachea or accumulated in the mouth.

This latter is the greatest advantage of the intra-tracheal method of administering ether. Formerly in such operations a posture more often than not greatly inconvenient to the surgeon and anæsthetist had to be adopted in order to prevent blood inundating the air passages.

As a practical example: Dr. Cuthbert Hall in an article on "Some Recent Deaths Under Anæsthesia" in THE MEDICAL JOURNAL OF AUSTRALIA, February 16, 1924, reports five cases that came under his notice. In four the anæsthetic agent employed was chloroform. In the fifth, a woman, aged twenty-two years, was given ether for the extraction of four teeth. Death occurred in ten minutes as a result of suction of blood into the larynx.

With the intra-tracheal method of administering ether the posture is of small importance. It is only necessary to see that the posture of the patient does not tend to occlude the catheter or pull it out of the trachea.

In such cases, therefore, the advantages of this system are so great that it is an absolute indication where facilities exist for its application.

Passing on to operations in the region of the neck this system of anæsthesia with its oral and intra-pharyngeal modifications is highly advantageous, if for no other reason than that the anæsthetist is kept quite out of the field of the operation and sterility is in consequence much more easily maintained.

In thyreoid gland surgery the selection of the anæsthetic is of no small importance.

Discussion at the recent Congress seems to favour the intra-pharyngeal method where no obstruction to the air way occurs. The anæsthesia must be kept as light as possible. Where the thyreoid is very large and tracheal obstruction a possibility, the intra-tracheal method should be used.

For operations on the pleura and lung ether given by the intra-tracheal method is undoubtedly the method of election. By this means a degree of pres-

sure can be kept up within the lung, sufficient to prevent its collapse when the pleura is opened.

The question next of the best anæsthetic for abdominal operations leaves a wide scope for discussion and it will be interesting to hear surgeons's opinions. In the hospitals in which I was resident in Sydney, several of the surgeons were using practically nothing else but some variety of this system in their more extensive abdominal and genito-urinary operations. I am speaking mainly of their private work which I often had the privilege to watch. Whether the system is going to secure general approval in all these conditions is problematical but without a doubt it is steadily gaining ground. The only disadvantages apparent are that the apparatus is costly and cumbersome and that there is a slight difficulty of technique.

As the oral or intra-pharyngeal routes usually suffice, this latter objection is practically removed.

It provides everything that the ordinary methods can claim together with several advantageous additions:

1. The slightness of the respiratory excursions with the consequent lessening of the abdominal movements and the greater relaxation of the abdominal walls render the task of the surgeon easier. It is for this very reason that some surgeons prefer chloroform for their abdominal work.

2. The anaesthetist has at his disposal a most effective method of artificial respiration which he can use at will.

3. The anæsthesia is absolutely even—once the machine is set there is no variation in its depth.

4. The post-operative effects of ether on the patient are greatly minimized.

5. The anæsthetist himself is not saturated with the anæsthetic.

In conclusion I also think it tends to promote a more sympathetic understanding between the surgeon and anæsthetist and this is indispensable if the full advantages of modern surgery are to be available for the patient.

## SOME REMARKS ON AUDITORY HALLUCINATIONS.[1]

By DE WITT HENTY, L.R.C.P., L.R.C.S. (Edin.),
*Hospital for the Insane, Royal Park, Melbourne.*

THE observations I am about to make are confined to a very small corner of a vast field. The kind of hallucinations with which I propose to deal, may be best indicated by the consideration of an actual case.

Miss A. is a middle-aged woman of blameless life. Her mother to whom she was tenderly attached, was ill for months and at last died. The daughter nursed her with unremitting devotion. Some time after the mother's death, Miss A. began to hear voices which said: "You starved your mother to death. You let her die of cold. You murdered your mother." The patient shows much annoyance at these accusations and protests with all her might that "they" have no right to say such things about her. She is rather vague as to who "they" are; she thought at first it was the neighbours, but, whoever they are, they have followed her to the Receiving House where she now is and she hears them talking outside the window every night. Any hint that "they" may be imaginary is scouted with contempt and anger. She says: "I can hear them as plainly as I can hear you."

This patient, it will be seen, is being subjected to a persecution by something that is quite outside her own personality. The facts, as she well knows, are that she loved her mother, did not desire her death and did her best to save her life. She knows that it is utterly untrue that she murdered her mother. She labours under the strongest sense of the cruel injustice of the charge that "they" bring against her. The accusation and the indignation at it imply two completely opposed points of view which it would be thought could not exist in the same individual. The fact—self-evident though it be—that the voices are indeed part of herself is really apt to be lost sight of when talking to such a patient. We find ourselves saying: "Oh, but that person doesn't exist; he's only in your mind." That he is in the patient's mind and not of it is the marvel. We cannot but feel that we are here in the presence of something very strange.

It is to the problem presented by such cases as this that my remarks will be chiefly confined. I have no new or original views to put forward; my object is only to bring to your notice certain facts and arguments which have led me to think it probable that some well-known hypotheses may express at least a portion of the truth.

For the sake of clearness let us consider very briefly what may be called the "physical" theory, which professes to explain all auditory hallucinations. According to this view, as I understand it, the words and sentences which cause the patient so much annoyance are due to some physical disturbance which affects the neurones in the brain. As a result of this verbal groupings are spontaneously generated. Owing to defect in those parts of the cortex which exercise a controlling and corrective faculty, the patient is unable to distinguish these verbal groupings from the psychic products of external stimuli. I think this states, as fairly as can be done in few words, the opinion of one authority at least. It seems to me, however, that the problem is hardly capable of such easy solution.

That the words heard by the patient simply arise spontaneously, out of the void so to speak, appears unlikely for reasons such as the following.

In all hallucinatory cases of the type I describe, the essential thing is not the words, but their meaning. A woman hears voices calling her a prostitute, saying she was out last night, that she is not married to her husband and so on and so on. The underlying idea in all this is: "You are immoral." This idea can be and in her case is expressed by very many different groups of words. If the root and beginning of the whole matter were a physical disturbance among the cells, we should expect that the patient would hear the same set of phrases,

[1] Read at a meeting of the Section of Neurology and Psychiatry of the Victorian Branch of the British Medical Association on February 18, 1924.

never varying, repeated over and over again. Moreover, if this physical explanation were the whole story, we should find much more variety among our cases; for it would surely be mere chance what cells were affected and therefore what words were heard. The voice might as well say: "You're a good woman" as "You're a bad woman." Whereas, when we consider the almost infinite complexity of the mind, what strikes us as so remarkable is that there should be such sameness in the symptoms in large groups of cases of auditory hallucination. The voices often blame, but rarely praise and rarely indeed do they talk absolute nonsense.

Can we think that the cells which are the physical basis of the words associated with the notion of immorality, are all clustered in one spot and that the disease process has a selective action on this spot? Some such absurdity as this, it would seem, is the logical outcome of the view I have mentioned.

The more closely we study the class of cases I have in mind, the more probable appears the view that these auditory hallucinations are to be regarded as the end-result of an orderly series of mental events and are not merely chaotic, wild chance happenings. Why these events should end in an hallucination at all—what the state of brain or mind is that immediately causes the sense-disorder—is, I submit, a problem that no one has yet solved. But given the fact of the hallucination, the answer to the question, "Why does it take such or such a form?" may perhaps be guessed at in some instances.

Let us now look at some other typical cases of auditory hallucination.

Mrs. B., aged twenty-nine years, was treated for two years by a Chinese herbalist, Mr. S., for bodily ailments which certainly existed only in her imagination—or in his. She now hears the voice of Mr. S. who is "continuing the treatment" by giving her constant instructions as to her diet and conduct. He tells her, for example, that she must sit in the sun. When the sun has become too warm, he tells her to go into the shade. He tells her very emphatically that she needs rest and must on no account do any work. He tells her to eat as much as she can: she does eat enormously.

This case is fairly straightforward. The hallucinations are in no way incompatible with the personality. On the contrary, the voice always tells her just what she is quite evidently wishing or hoping herself; the wish is father to the voice. One may almost say that this patient thinks in hallucinations. While we need not for a moment think that she was "in love with" her herbalist, it is plain that he made a deep impression on her; long before the hallucinations appeared she used to talk about him.

Another case, very like this last, is that of Mrs. C.

Mrs. C.'s age was fifty-five years. She had "followed spiritualism all her life" and had received many messages. These were in the form of "inward voices." Following alcoholic excess she began to suffer from visual and auditory hallucinations which cleared up within a week or two. The voices were not of a particularly disturbing character. Once or twice they told her she would be punished for sexual wrong-doing, but she did not seem to be much worried about the matter. She said with a smile: "I've had a few . . . flirtations, to put it mildly."

This case, it will be observed, resembles that of Miss A. in that the patient is reproached for wrong-doing by an hallucinatory voice. But it is understandable enough. The "spirit voice" that reproached her, was very like her previous messages which were all very obvious expressions of conscious hopes or in some instances fears. She, again, might be said to think in hallucinations; she admitted her wrong-doing and her "voice" was simply and literally the voice of conscience.

It now becomes necessary to refer to the subject of what have been called "defence mechanisms."

A boil to most people is merely a painful red lump with a mass of corruption inside it. But to the pathologist a boil is something quite different. It is the result of an elaborate mechanism whereby the body is protected against invading bacteria.

It has been suggested that just as Nature has provided defensive mechanisms for the body, there may exist analogous mechanisms for the protection of the mind and just as the phenomena of inflammation, when examined, are found to show order and design, so in certain diseased states of the mind there may be a kind of order beneath the apparent wild disorder. It may be pointed out, moreover, that in the case of the body the defences may fail before the violence of the attack and, also, even if adequate, the defence may be in itself the cause of a great deal of suffering to the patient. We must not push the analogy too far; but we can perhaps see in some mental states evidence of defensive mechanisms which may be adequate, may fail altogether or may themselves cause as much mental suffering as the trouble they are trying to relieve.

To one such mechanism the name of "projection" has been given. With this process we are all familiar. "A bad workman blames his tools." He refuses to admit that he is incompetent: the idea of inferiority—unbearable to him, as to all of us—which will persist in trying to force itself into his consciousness, is got rid of by being projected into his environment. By accusing his tools of inferiority he is able to keep his self-esteem. It may be observed that he is now suffering from a delusion. He says and believes that his chisel is blunt or his gimlet crooked; these beliefs are absolutely false and are seen to be false by everyone else.

Othr examples of this so-called "projection of the complex" are plentiful. The gaol governor in Charles Reade's novel who, when not employed in thinking out ways of adding to the wretchedness of his prisoners, used to rouse himself to fury by reading of the cruelty of Legree in "Uncle Tom's Cabin," is a piece of sound observation on the part of the author. The village gossip will conclude her merciless exposure of the morals of her neighbours by telling you that there never was such a place as this for talk and by wishing to goodness people would mind their own business. We can all find further instances among our friends. Perhaps in rare moments of insight we may even catch fleeting glimpses of this tendency in ourselves.

In another, more complicated form of projection the subject who has been guilty of what in his eyes

is wrong-doing, imagines himself to be reproached for it by other people. He may or may not admit the wrong-doing; he never admits the justice of the reproach. In cases where the wrong-doing is not admitted, it is evident that the individual has somehow cut off from his personality the whole system of ideas containing the complex and the reproach. How this is brought about is a question involving some very debatable theories which I do not propose to discuss. I think we may admit evidence in favour of the truth of the general statement without committing ourselves to any theory. Since the important thing to the individual is that he gets rid of his troublesome self-reproach by projecting it into his environment, I shall for the sake of brevity speak of this state of things as "the projection of the reproach."

The following is an example. We often see, especially in country newspapers, an advertisement like this: "If residents of Possum Flat do not stop passing remarks about my character, they will be prosecuted." We shall probably do no grave injustice to the advertiser if we conclude, first, that her conscience is not quite clear and, second, that she exaggerates the extent to which her neighbours are talking about her. Instead of reproaching herself, she imagines that the whole community spends its time in reproaching her; the emotion aroused by this belief is anger which is easier to endure than remorse.

It is remarkable and perhaps significant that whereas projection of the complex is common among the sane, good examples of projection of the reproach are not so easy to find. On the other hand, they abound among the insane; and we wonder whether some of the people who advertise in the way I have mentioned, may not be suffering from incipient insanity.

A typical case is Miss D.

Miss D.'s age is about forty years. Her general level of intelligence is about equal to adult standard, but her conduct is eccentric owing to her delusions. She has no hallucinations. In childhood she practised auto-erotism a few times and also some acts of a vaguely sexual nature with another little girl. She is a virgin and denies sexual acts of any kind since childhood. She is often angry with other patients who, she says, are always making sly allusions to her childish sins. Her point is that she is now chaste and that they accuse her of being otherwise. A patient stands behind her: this alludes to the attitude adopted during the acts mentioned. Someone moves a chair: the patient once sat on the arm of a chair while practising auto-erotism. She was offered a book: this also was a grievance, for the exquisite reason that a book had nothing to do with her actions.

Here we have a case where the reproach is plainly projected into the environment. The patient admits wrong-doing and judges herself more severely than anyone else ever would; she had repented long ago, but she cannot get absolution. Her uneasy conscience gives her no rest. But unquestionably she has gained by the trick her mind has played on itself. She is comparatively happy during a great part of her time, whereas, had she not projected her reproach, she might have been miserable.

The next case is Miss E..

Miss E. is aged forty years. This patient was at the Receiving House for a month in the winter of 1922. She was re-admitted in January, 1923. She had often spoken admiringly and affectionately of a Dr. X. who certified her on both occasions. Shortly after her second admission she heard the nurses talking night after night about her. They said she was pregnant by Dr. X.

She was indignant at the awful accusation and it is to be noted that her annoyance was largely on account of the insult to Dr. X. who, she says, is a pure Christian man. Miss E. is of average adult intelligence, but on the emotional side is child-like. She is deeply religious in a crude, almost infantile fashion. Her mind is full of sexual ideas. She is, of course, a virgin. I believe there has been no auto-erotism or any sexual experience.

It seems reasonable to think that this patient is in her own way in love with Dr. X.. That she should wish to have a child by him; that the thought should be rejected as terribly wrong and that her self-condemnation for the crime should be projected on to the persons of the nurses—that this should be the sequence of events is, I submit, at least a plausible view. If I am right, this case is of great interest, for in it we see laid bare the course of the mental events which have ended in the hallucination. It forms a link between the case of Miss D. and the one which I mentioned first—Miss A..

Let us return for a moment to Miss A.. After her mother's death, she was not only grief-stricken but worn out by the overwork and want of sleep involved in nursing her. She is, we may well suppose, one of those unfortunates who are cursed with a restless, uneasy conscience. She worried and worried, saying to herself all the time: "Is it right to do this? Ought I to have done that? Will this do harm? Would that have done good?" Then, when all was over: "Would she have lived if I had done so and so? She would not have died if I had not done such and such things." Add to all this the possibility, even the likelihood, that the most devoted of daughters might say to herself: "If only the end would come it would be a mercy. It would mean rest for both her and me." At length, in her exhausted state of body and mind, the idea that she really did desire her mother's death and did kill her by her neglect takes more or less definite shape. She represses the dreadful thought; but it strives to get into consciousness and it does so at last, not directly, but as an hallucinatory voice. She has, in short, projected her reproach on to imaginary people.

It seems evident that these three cases are fundamentally alike. In each the patient from her own point of view is being accused of wrong-doing by people other than herself. At the first glance there seems perhaps little likeness between Miss D. and Miss A., but the resemblance is seen when we compare them both with the connecting link, Miss E.. The same mechanism is at work in all three cases.

It is interesting to compare the case of Miss A. with that of another woman whose history is very similar.

Miss F. nursed her mother, who died; she became mentally ill soon afterwards. In her aspect and conduct she is a striking contrast to Miss A. Miss A. takes pride in her personal appearance, is active, employs herself in

various ways and like Miss D. is fairly happy during a great part of her time. Miss F., on the other hand, walks about aimlessly, wringing her hands, or stands or sits motionless. She does not occupy herself in any way; her expression is one of complete and utter misery. If one questions her, she answers slowly in a doleful voice, but clearly and coherently. It appears that she accuses herself of being the most wicked of women: she murdered her mother.

Here we have two people, both of whose minds have undergone the same kind of stress; both are insane; but one is fairly comfortable, the other utterly wretched. What is the quality in the mind of each that made her react so differently from the other? The suggestion is at least worth serious consideration, that the whole difference lies in the fact that the mechanism of projection is at work in one case and not in the other.

It is significant that in such depressed cases as Miss F., hallucinations are rare; in pure melancholia they do not occur. The patient's mind is so built that she must endure the whole burden of her reproach; accordingly, she is miserable. It is worth noting, too, that Miss A. has a much more distorted mind than Miss F. She has obtained relief by a serious sacrifice of her mental integrity; she is much more out of touch with reality than Miss F.. Therefore, we would expect her to be less likely to recover than she whose mind is less out of gear, and this expectation is abundantly confirmed by experience.

I need not lay stress on the well-known fact that little or nothing can be done in the way of exploring the minds of such patients as I have described by any method of analysis. They are incapable of introspection and their cooperation is not to be hoped for. All we can do, in general, is to compare one case with another, as I have been trying to do, and thereby arrive at a more or less probable conjecture. A well-established case of long standing, of whose past thoughts and feelings, even of the events of whose life, nothing whatever is known, presents, if taken alone, an absolutely insoluble problem. There are simply no data. We can guess; but we have no means of knowing whether our guesses are right or wrong.

What, for example, are we to say of those cases, very common indeed, where the patient (call her Mrs. G.) is a woman not merely of apparently blameless life, but of what Dickens calls "indomitable and savage virtue," who hears voices accusing her of unspeakable sexual offences? Are we to say that this woman really had done such things, or had even wanted to do them? Is not the mere suggestion a frightful libel on a virtuous woman?

We must remember that, guilty or innocent, the patient is her own accuser. Let her protest until she is hoarse that she had never heard of such things until "they" spoke about them; let her call on heaven to punish the abominable evil-mindedness of her accusers, let her frown disapproval on the nurses' ankles and shrink indignantly from the doctor's hand laid on her shoulder; she cannot blind us to the fact that the voices are her own absolute property, the result of the unassisted efforts of her own mind.

It is, of course, quite hopeless to try to get any helpful information from such a patient as this. But there is another large class of patients in whom by the hypothesis the mechanism of projection has not operated, and who are in general depressed as the result of what they consider their wrong-doing. From these patients we very often obtain confessions of actions which seem just as inconsistent with the rest of the personality as any of those of which the others, the "virtuous" ones, are accused by their voices.

Miss H., aged forty-seven years. She is quiet, well-conducted, very unselfish and eager to help and comfort other patients. She is deeply and genuinely religious and her conduct is consistent with her professions. She is intensely depressed. She says there is a fight going on between God and Satan over her soul. She told me that at the age of six or seven she was sexually initiated by a boy of about twelve. She thinks the boy had intercourse with two or three other girls on the same occasion. After that there were other boys. At age twelve, incest occurred with her brother aged sixteen or seventeen. This went on until she was sixteen. She was "converted" at age sixteen and then realized that what she had done was wrong. She continued, however, to practise auto-erotism and has done so at intervals ever since. She confessed other things, but these will do to go on with.

If this woman had not confessed, who could have suspected such a history? Surely our experience—I may say our daily experience—of such cases as this should teach us that where sex is concerned one should be surprised at nothing.

In the case of the virtuously indignant type of patient we need not in all nor perhaps in most instances assume that she has ever really done the things of which she is accused. We do not suppose that Miss A. really murdered her mother; but a wish for her death might have forced itself into her mind. Similarly in Mrs. G. we must remember the possibility of an abnormally sensitive conscience which considers that the thought is as bad as the action. It is easy to imagine how thoughts and desires, regarded as wicked, might come unbidden and might be afterwards repented of as bitterly as if they had been actual deeds. When all is said, however, it must be admitted that Mrs. G. whose mind is such a mass of frantic inconsistencies, remains a problem with a complete solution still very far to seek.

It will be recognized that the views I have discussed can be applicable only to a limited number of cases of hallucination: to those, namely, in which there are auditory hallucinations taking the form of accusing voices. Nor do I think it probable that even all those cases are to be explained in the way I have described. Each case must be judged on its own merits. Here is an instance in point.

The patient, Mrs. K., a woman of forty-five years, actually was for a long time subjected to persecution by some unfriendly neighbours. There is clear independent testimony that they were always "slinging off at her"; they used to scream across the street to each other, but "at" her, making unmistakable allusions to her and her children. This worried her to such an extent that she began to see references to herself in quite innocent words and actions. The accusations at first were that her children were neglected and verminous. Later she imagined that she herself was being called diseased and dirty. She has illusions of hearing, little removed from

actual hallucinations. She hears the murmur of real voices at a distance and supplies the words herself.

It is noteworthy that the emotional state of this patient is one of fear, not of anger. She is like a person in a haunted house who starts at every noise, expects each moment that something awful will happen and—shall we say?—fancies sounds where there are none.

Here it seems allowable to suppose that the real persecution, acting on a mind already unstable—she is passing through the menopause—may have not only thrown that mind off its balance, but also determined the form of the mental disorder. Her present state of mind is only an exaggeration of what one might expect in a person so badgered and teased as she had been. We need not assume that any real self-reproach was ever present in this woman's mind. Thus it would seem that this case, though superficially resembling some of those I have cited, may be at bottom quite different from them. But here, again, we are met with a complication; there is a man in the case. People have been accusing her of being too friendly with a certain man whom she has known from childhood. The neighbours one night were speaking of petitioners and co-respondents. What are we to think? Perhaps some day a genius will arise who will show us how to explore the depths of such a mind as this.

As another instance of the kind of problems that we meet with, take a case of confusional insanity due to alcoholic excess. If the patient is a woman who has borne children, it is very common to find her saying that there is a baby in bed with her: she knows it is there because she hears it crying. It cannot be mere chance that "the baby in the bed" should be such a characteristic feature in the case of the female alcoholic. There must be a reason, could we but discover it.

It is with some diffidence that I offer the following suggestion. We know from the confessions of such patients that while the habit of alcoholic excess is being formed, they spend their lives in alternately sinning and repenting. The victim knows that her drunken habits make her neglect her home and her children; she struggles against her vice, but in vain; at length there comes a time when she struggles no longer, but finds in alcohol her only relief from the self-reproach which alcohol has caused. If there is one sound on earth that is likely to strike reproachfully on the ear of a woman whose maternal instinct is strong, that sound is the crying of her neglected child. Such a woman as we are speaking of must have had some very unhappy moments when the crying of her baby woke her from a drunken sleep. When at last the stage of actual insanity is reached, the insistent reproaches force their way into consciousness, symbolized in the form of the crying of a baby.

It is clear that if we find "the baby in the bed" in the case of a woman who did not begin to drink until her children were grown up, this theory goes by the board. I put it forward for what it is worth, recognizing that further experience may at any time force its rejection.

It is not to be expected that any one formula will ever be found that will explain all cases of hallucination. Those in the group of which I have been speaking, form only a small minority of all cases of auditory hallucination. Problems of the utmost interest, again, are presented by hallucinations of the other senses. Though all these cases bear a resemblance to each other, in that they have the one outstanding feature in common, namely, disordered sensation or perception, closer examination will show, I think, that this likeness is often misleading and that the minds of these patients in their depths are by no means all alike.

Taking this "projection of the reproach" as a symptom, has it any significance from the point of view of prognosis? All the evidence seems to show that we must regard it as a bad sign. It looks as if the kind of mind that is able to react in this particular way, is essentially an unsound mind; there is something wrong with its construction from the beginning. Therefore, if in a case of hallucination we find this symptom well developed, we are pretty safe in saying that permanent recovery for that patient is unlikely. Unfortunately, it does not follow by any means that the absence of the symptom is necessarily favourable.

It must be candidly admitted that it would be possible to make almost any theory appear plausible if only we selected the right series of patients from among the mass of material available. I think, however, that the cases I have mentioned are typical; their essential features repeat themselves over and over again among our patients. While I feel no certainty that the views I have been putting forward, will stand the test of wider experience on my own part, my justification for bringing these observations under your notice is the hope that I may profit by any criticisms that those of more experience than myself may think it worth their while to offer.

## INFANTILE PARALYSIS OF CEREBRAL ORIGIN.[1]

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IN this paper I propose to deal with a large group of paralyses of cerebral origin not infrequently met with in practice and denoted variously by the names Little's disease, cerebral diplegia, infantile hemiplegia and infantile encephalopathy. These paralyses are the outcome of nocive agents or lesions interfering with the growth and development of the brain, arising either before or at birth or during early infancy, and of such extent and severity as to disturb motor and intellectual functions. They represent a class of conditions concerning which clinically, ætiologically and anatomically there is considerable confusion. To remove some of this confusion is the object of my paper.

[1] Read at a meeting of the Section of Pædiatrics of the New South Wales Branch of the British Medical Association on March 15, 1924.

### Ætiology.

In the first place we shall arrive at a better understanding of these conditions by remodelling our views on their causation. In text-books we find a long and confusing catalogue of factors, thus, heredity, disparity in age between or consanguinity or neuropathic tendencies in the parents; toxi-infections, especially syphilis and alcohol, at the time of conception or during pregnancy; injuries during pregnancy in the shape of falls and attempts at abortion and shocks, emotional disturbances, attacks of eclamspia and insanity during the same period; long drawn out labour, especially in *primiparæ* and with male children, malpresentations, instrumental deliveries, premature and precipitate deliveries and lastly acute infections during early infancy.

This long list might be extended still further and its fault is that it does not sufficiently take into account the variety both of the clinical forms of these paralyses and of the anatomical lesions which underlie them. For example, concerning consanguinity or neuropathic tendencies in the parents, none will deny that these may prejudice the mental health of the offspring and they may possibly be the cause of obscure neuronic developmental failures, but that they can produce gross paralytic lesions is beyond conception. There are many other causes in the list which are of doubtful importance and although we cannot altogether dispute them, we are entitled to say that they rest on a basis which is speculative, and that they are exceptional. What then are the usual causes? I will quote two authorities. First there is Babonneix, a French writer, who gives three, *videlicet* congenital syphilis, trauma at birth and alcoholism in the parents. Secondly, Dr. James Collier, of London, confining his remarks to "Little's Disease" in pure form gives one cause alone, *videlicet* primary neuronic failure of development. Let us consider these causes individually.

Syphilis is without doubt a factor. In our experience at the Royal Alexandra Hospital for Children we have seen a number of instances of both diplegia and monoplegia in which the mother has given a history of miscarriages or of children dying in infancy, or the parents, one or both, have been patently syphilitic, or the subjects themselves have reacted to the Bordet-Wassermann test or have shown Hutchinsonian teeth, interstitial keratitis, Argyll-Robertson pupils and so on, or on *post mortem* examination have shown unmistakable syphilitic changes.

As to the second factor, trauma at birth, there can be no question that this is to be reckoned with, but not so often as some maintain. Take an ordinary case of diplegia. This entails an obliteration of both motor areas and the question may be asked how often can trauma at birth bring about the needful clean bilateral obliteration? In point of fact a birth trauma is usually unilateral and, if the child survives, the result is a monoplegia or a hemiplegia. If it were bilateral, survival could hardly be expected. Here it may be mentioned that Little himself was a firm believer in the influence of birth damage; he pinned his faith, however, not on destructive lesions such as lacerations or large hæmorrhages, but on asphyxiation and microscopical damage. Little's conception was a plausible one, but it is discredited by present day pathologists, especially those who hold that the origin of the diplegia is to be sought in some condition arising before birth—some agenesis or failure of development in intra-uterine life, accounting alike for the birth difficulty, perhaps prematurity, and the subsequent diplegia. It must be obvious that the chief difficulty in establishing birth trauma as a pathogenic factor in these cases concerns anatomical diagnosis. We do not see these brains soon after birth, we only see them after the child has lived some years and the clinical features have been proclaimed. By this time so much absorption and repair has taken place as to obscure the nature of the original lesion.

Next concerning the causative importance of alcoholism in the parents, whether Babonneix is right in placing this so prominently is doubtful. There may be such a thing as the "Sunday child" conceived under toxic circumstances, but as compared with the syphilitic child, the determining proofs are minimal.

Concerning the fourth factor, primary failure of neuronic development, this of course is difficult to establish, because it has its beginning *in utero* and its cause, if we except syphilis, is a mystery. On no other ground, however, can we explain some of the remarkable examples of atrophy and sclerosis, often symmetrical, often not deforming to the convolutional pattern and therefore not due to gross vascular or destructive lesion, which we meet in true cases of diplegia.

To sum up then, the ætiology of these conditions is difficult to determine, but in the production of the diplegias syphilis and developmental anomalies seem to be the most likely factors; birth trauma is only important in producing monoplegias. Other alleged causes are two speculative for acceptance.

### Anatomy.

Autopsies in these patients yield a multitude of astonishing revelations. I will only make cursory reference to them.

First, we may see the convolutional atrophy and sclerosis already mentioned and believed to be due to developmental failure.

Secondly and more commonly we find indications of chronic meningitis and meningo-encephalitis which may be in any part of the brain. In most instances these show histological changes indicative of an active syphilitic process.

Thirdly, a general atrophic sclerosis of one hemisphere or of the whole brain may be found—a condition also believed to be syphilitic in origin. I recall such a case in which one hemisphere was about half the size and weight of the other, although retaining its form and convolutional pattern.

In other cases of diplegia and monoplegia there may be the remains of old patches of softening

obviously due to arterial closure and unlike those found in adult life. I have seen a considerable number of these and syphilitic endarteritis must be looked upon as the chief cause of the lesion.

As further showing the widespread effects of syphilis I may mention that in cases of Mongolism gummata have been found in the brain. (This does not mean that all Mongols are syphilitic).

Concerning birth injuries, I have notes of cases in which an old standing thrombosis of the superior longitudinal sinus, probably the outcome of injury, was the essential lesion.

I have never seen the remains of large subdural hæmatomata. The obvious reason is that they prove rapidly fatal.

It is also likely that other hæmorrhagic non-fatal processes lose their character with the progress of time and growth and become no longer recognizable as such. Subcortical cysts, however, I have seen in cases of hemiplegia and as these contained hæmatoidin crystals, there is small doubt as to their origin.

Porencephaly is a striking finding mainly of pathological interest. One sees all degrees, from the porus or hole connecting the subarachnoid space with the lateral ventricle—hence the name porencephaly—to cases where there is merely a loss of substance with accompanying cicatricial changes deforming to the convolutional pattern and sometimes bilateral. The most reasonable view on the cause of this remarkable condition is that ascribing it to an arterial thrombosis or embolism practically a softening arising in intra-uterine life before the convolutional pattern is laid down, that is before the seventh month. On this supposition alone can we account for the bizarre, usually radiate disposal of sulci and gyri invariably seen around the lesion.

Here a reason may be offered why these early lesions of certain parts of the brain bring forth clinical phenomena divergent from what we observe in similarly placed lesions in the mature brain; it is that Nature intervenes with her effort to restore or make good the developing function and is more successful with the growing than the mature brain.

Tuberose sclerosis is another extraordinary condition which is sometimes found in cases of infantile diplegia and hemiplegia, and I hesitate to include it here because it is a disease with its own entity.

Lenticular degeneration (Wilson's disease) is another paralytic condition, an extra-pyramidal one, which we sometimes see in childhood, but like tuberose sclerosis it is a disease in itself.

There are also unmistakable conditions like hydrocephaly and microcephaly, associated with paralysis, which it is necessary just to mention.

Finally, in taking a general view of the pathological processes occurring in these cases of infantile paralysis, the unsatisfactory point is that we are in great measure ignorant of their origin. We cannot say exactly what is due to agenesis, what to injury and what to disease. We are forced to group them artificially and the only part of them which is clear, deals with consequences.

### Clinical Description.

It is now over eighty years since Dr. Little described the disease which bears his name and his description was so accurate that it needs scarcely any alteration today, but it must be understood, as Collier has pointed out, that the term "Little's Disease," strictly speaking, should be confined to cases of spastic diplegia associated with difficult birth and is not properly applicable to all the infantile paralyses of cerebral origin with which we are dealing. Accordingly, to the better understanding of these it has become necessary to divide them into groups. And even when so grouped there is overlapping, still the following subdivision, on lines suggested by the late Dr. Batten is convenient for descriptive purposes, provided it be remembered that few cases run true to type.

#### *The Spastic Group.*

The spastic group comprises the majority of cases and those observed by Little whose description reads somewhat as follows: The legs are spastic, partially flexed at the hip and knee joints and extended at the ankle. The thighs are adducted and the feet divergent. Placing the child on its feet and asking it to walk, the gait is stiff and digitigrade, the knees rub against one another causing the feet to lock and greatly impeding progress. It is the so-called scissors or cross-legged gait. In the sitting posture the child is unable to hang its legs.

The knee jerks are lively. Ankle clonus, provided the rigidity be not too great, may be obtained. The plantar response is usually but not always extensor, and the abdominal reflexes are usually but not always absent. This occasional persistence of normal plantar and abdominal reflexes is singular considering that there must be pyramidal tract degeneration, indeed there is little doubt that the lesion in these cases essentially involves the motor cortex.

In some instances the affection is confined to the legs, but in most the arms are rigid, extended and pronated in some degree. The trunk, neck and even the face (spastic face) may be involved.

The mental state is one of more or less deficiency.

#### *The Atheloid Group.*

The atheloid group is characterized by slow worm-like movements, occurring with or without voluntary movement. Arms more than legs are affected. Sometimes the movements extend to the face and tongue and cause grimacing and faulty speech.

These curious movements are not noticed at birth. They appear and become worse as the child grows. Two singular facts are, first, that there may be no muscular weakness or spasticity or alteration of reflexes and secondly, that in some cases the intelligence is preserved to a greater degree than the impaired movements, awkward gait and faulty speech may suggest.

In cases of this group and of the choreic group about to be described, the lesion is focussed on the *corpus striatum.*

*The Choreic Group.*

The movements seen in a typical case of the choreic group simulate those of ordinary chorea, but of course their persistence proclaims a difference. Occasionally it happens that the movements are so intense as to call for mechanical restraint. Convulsions also are not uncommon.

*The Perverse Movement Group.*

Collier first drew attention to cases of the perverse movement group and gave them the character of "maladroitness." They are clumsy more than athetoid or choreic and exhibit their disability when handling objects as well as when walking and running, some also show a tremor like that seen in disseminated sclerosis.

*The Atonic Group.*

Those in the atonic group simulate *myatonia congenita* and it is doubtful whether the atony is due wholly to cerebral defect, but they are mentioned because the electrical reactions of the muscles are normal and this suggests cerebral defect. Moreover, in some cases of this kind a small, simple and unconvoluted brain has been found (lissencephaly).

*Infantile Hemiplegia.*

The infantile hemiplegia here alluded to is not that due to such obvious causes as polioencephalitis, tumour of the brain *et cetera*, but to causes already mentioned as inducing diplegia. Batten described the condition in a separate chapter, but his reason is not apparent. Plainly they represent only a degree of diplegia, the productive lesion happens merely to be unilateral.

This completes the groups into which these cases can be divided clinically. I have already mentioned that there is much overlapping of types and it only remains to be added that other symptoms may arise in any of the groups. Mental deficiency in every degree from mere moral perversion to blank idiocy; speech defects; epilepsy; degrees of blindness often accompanied by nystagmus; strabismus, dysphagia may all be encountered.

**Diagnosis.**

The recognition of these conditions presents few difficulties. In early infancy the intelligent mother observes that the movements of the child are imperfect; also the difference in mental health between the normal and the deficient child is such that it can hardly escape notice. Both are readily verified by the physician and serve as warning of grave trouble.

When the subject passes from infancy to childhood a number of diseases and conditions which may appear at an early age and induce paralysis of some kind, have to be remembered and differentiated, for example some of the myopathies, Wilson's disease, juvenile general paralysis, Friedreich's disease, *amyotonia congenita*, post-encephalitic and polio-myelitic paralyses, and paralyses due to vascular disease, meningitis, abscess and tumour. On the whole this differentiation is not difficult.

**Treatment.**

History tells that the deformed and paralyzed children of the Lacedæmonians were ruthlessly cast into the river Eurotas. Today, however, humanity dictates that notwithstanding the hopeless aspect of the case we must give of our best. We may be able to give little, but we are not entirely without means.

Since syphilis plays such an important part in causation, the use of anti-syphilitic remedies is always to be remembered and may in some instances prove strikingly beneficial.

Concerning organotherapy, so commonly prescribed, there is nothing favourable to be said. Gland products may correct gland deficiency, if in evidence, but that they can materially alter a gross paralytic lesion or its effects is beyond conception.

In conclusion, I need hardly say that many of these paralyses are of such a kind that benefit may accrue from modern surgical measures. Here, however, the warning must be given that before attempting such measures, our deliberations should include guaging the mentality of the subject, because the surgical benefit will be proportionate to the ability of the patient to assist in the all-important after-treatment.

## Reports of Cases.

### RUPTURE OF THE SPLEEN.

By ERNEST CHENOWETH, M.D. (Melbourne),
*Medical Superintendent, Mackay District Hospital, Queensland.*

S.R., AGED twenty years, was admitted to Mackay Hospital on December 31, 1923, complaining of pains in the abdomen and difficulty in breathing. Twelve hours prior to admission he had been kicked in the left side of the chest by a horse. The features were pale and drawn, the skin was cold and clammy and the breathing rapid and shallow. The temperature was 37.3° C. (99.2° F.), the pulse one hundred and ten and the respirations forty in the minute.

Examination showed the contused outline of a horse's hoof spreading over the seventh, eighth and ninth left ribs between the nipple and mid-axillary lines. There was no sign of a fractured rib. The abdomen was distended and moved very slightly with respiration. Liver dulness was completely absent. There was dulness in the left flank and rigidity and tenderness prevailed over the whole abdomen, more especially in the left hypochondrium.

The abdomen was opened on the left side above the umbilicus and was found to be full of blood with a badly ruptured spleen still bleeding freely. The viscus was in two almost equal halves, the wound extending right through to the hilum.

Inability to deliver the organ rendered ligation of the pedicle necessary and this was done with strong catgut. The bleeding was controlled, but an attempt was made to prevent necrosis of the spleen by not tying the ligature too tightly. A gauze drain was packed into the wound and was completely removed by the sixth day. On the third day the abdomen was somewhat distended and there was coffee grounds vomitus. A stab incision was made into the peritoneal cavity in the left iliac region and a rubber tube inserted. A quantity of old blood drained away and his condition steadily improved from that time.

The unusual features were:

1. The high position of the external violence relative to the resultant injured organ.
2. The absence of any damage to the ribs associated with complete rupture of the spleen.
3. After the injury the patient walked twenty yards to his house, procured a rifle and shot the horse.

# Reviews.

## PSYCHO-ANALYTICAL METHODS.

PERHAPS no more bewildering phase of medical work impinges itself on the mind of the general practitioner than the treatment of the various neuroses. Modern civilization with its stress and strain seems to have accentuated if not created endless 'phobias and remarkable behaviour patterns and the taunt "thou canst not minister to a mind diseased" leaves the physician feeling hopeless and depressed. The psycho-analyst like the ancient soothsayer or the still more ancient exorciser of demons now steps into the breach. The determinant of behaviour can be traced to the subconscious. The underlying motive may then be revealed to the patient and re-education begun.

All of us have heard many statements "about it and about," but this book of Baudouin goes much further than statement by relying on the inductive method, while at the same time explaining the technical terms of this new and strange subject.[1] After a theoretical exposition of the dynamics of the affective life a series of twenty-seven case histories is described in detail. These case histories give a most excellent description and conception of the whole attack on the problem. A bibliography and index are added. For the practitioner who wishes to get some definite conception of what it all means, these case histories are invaluable.

Whether we are prepared or not to go the whole way with the author in a full acceptance of his symbolic imagery and methods does not matter, the descriptions are excellent and most illuminating and may thus readily be of service to the medical practitioner in his daily duty towards so many unhappy human beings who turn to him for help.

## GAS POISONING.

GLAISTER AND LOGAN'S book "Gas Poisoning in Mining and Other Industries" is a very valuable contribution to the subject of poisoning by carbon monoxide and other gases.[2] The volume deals comprehensively with the causation of accidents in mining and other industries arising from foul air and noxious gases and with the symptomatology, treatment and pathology of carbon monoxide poisoning. It is illustrated by numerous clinical records. Methods for the detection and quantitative estimation of carbon monoxide in the blood and in air are discussed and the final chapter is devoted to a description of apparatus for rescue and aid work in mines.

Acute and chronic poisoning by carbon monoxide may give rise to an astonishing number of remote effects, the most important of which are various nervous and mental disorders. Pneumonia, which is a frequent sequela of carbon monoxide poisoning, is attributed by Mosso to inflammation of the lungs brought about by paralysis of the vagus nerve, an opinion which is also held by the authors. One fact that needs special emphasis, is that even in slight cases of carbon monoxide poisoning, where none of the signs and symptoms point to danger, the patients may develope serious sequelæ which may last permanently. Cases of sudden death have followed what appeared to be comparatively slight poisoning and when everything seemed to point to a speedy recovery. A patient does not necessarily require to be rendered unconscious for dangerous sequelæ and even death to ensue.

As this book was published in 1914 it is interesting to note that attention has not been drawn to the dangers in garages *et cetera* of poisoning by the exhaust gases of motor cars. Alice Hamilton has found 9% to 10% carbon monoxide in the gases from a cold engine. The authors recommend the use of artificial respiration apparatus, such as the pulmotor, in treatment. This is contrary to the opinion of the American Commission on resuscitation from carbon monoxide asphyxia. In the final report of this Commission it is stated that the employment of such devices may often do actual harm and the Schafer prone pressure method is strongly recommended. This Commission further advocates the use of carbon dioxide-oxygen inhalations developed by Henderson and Haggard as a treatment for gas poisoning, as many observations both in the physiological laboratory and clinically have shown that respiration can be greatly increased by adding carbon dioxide to the air breathed.

With regard to collieries the authors point out that coal dust is in the great majority of cases the agent wherein carbon monoxide originates. By its agency deaths are produced and if it is removed from the workings of a colliery or treated in such a way as to prevent it being raised as a cloud, the dangers from ignition of firedamp will be almost entirely eliminated. In the Annual Report of the Department of Mines, New South Wales, for the year 1922 an account is given of the measures of "stone dusting" adopted by one colliery to try and prevent coal dust explosions.

The widespread and enormous use of gas nowadays for industrial purposes makes it very important that medical practitioners should understand and explain how gas poisoning accidents arise and how they may be recognized. This book will serve a very useful purpose in this direction.

## BLOOD PRESSURE.

IN his manual for practitioners entitled "High Blood Pressures: Its Variations and Control," Dr. J. F. Halls Dally, as he informs us in the preface, has endeavoured to present "to the general practitioner in condensed and applicable form the modern views regarding blood pressure."[1] He is to be congratulated on the successful way in which he has dealt with the subject.

We have so often been at a loss when asked by young practitioners to recommend "a concise and handy volume in which they can readily find expressed in simple terms the essentials which they require to know," that we feel we owe the author a personal debt of gratitude for placing this book upon the market, quite apart from the pleasure we have derived from reading it.

A medical monograph is so often a compendium of other people's views compiled by the author that it is refreshing to discover that here we have Dr. Dally himself. While he utilizes the most recent literature in support of his views on more or less controversial matters, his work is essentially a personal essay upon the correct method of estimating, interpreting and treating (where indicated) high blood pressure. In addition, a few cognate matters such as the arterial pressure in pulmonary tuberculosis and arterial pressure in relation to life assurance are briefly but very usefully discussed.

There is little scope for unfavourable criticism, though naturally experienced readers are likely to join issue on some or other of the views held by the author about various admittedly controversial questions.

We hope that this book will find a very wide sale. We feel sure that the better understanding of the diastolic pressure alone that would result, would be of material benefit to the general public. It is, perhaps, too much to hope that the temptation to impress an anxious patient will be resisted by all who read on page ninety-one that in regard to such cases "it is advisable for the doctor never to state the exact figures that the arterial pressure has reached. . . . The truth, but not the whole truth, should be told, so that the patient may be warned and safeguarded, but not alarmed."

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[1] "Studies in Psychoanalysis," by Charles Baudouin; Translated from the French by Eden and Cedar Paul; 1922. London: George Allen & Unwin, Limited; Sydney: Angus & Robertson, Limited; Demy 8vo., pp. 352. Price: 16s. net.

[2] "Gas Poisoning in Mining and Other Industries," by John Glaister, M.D. (Glasgow), D.P.H. (Cambridge), F.R.S.E., Etc. and David Dale Logan, M.D. (Glasgow), D.P.H.; 1914: Edinburgh: E. and S. Livingstone; Demy 8vo., pp. 483, illustrated. Price: 12s. net.

[1] "High Blood Pressure: Its Variations and Control," by J. F. Halls Dally, M.A., M.D., B.C. (Cantab.), M.R.C.P. (Lond.); 1923. London: William Heinemann (Medical Books), Limited; Demy 8vo., pp. 165, with 23 illustrations. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, MAY 24, 1924.

## A Safe Milk Supply.

MILK is almost an indispensable article of food for man at every period of his life. It is the food intended by Nature for use in his earliest years and there are few adults who do not consume some quantity of milk every day. At the same time it is a food which is most liable to contamination and chemical spoiling. In the large and crowded cities of the present day where milk is consumed at a relatively great distance from the source of supply the effects of contamination have time to become accentuated. Bacterial contamination may occur either in the mammary gland of the animal giving the milk or from the introduction of organisms during or after the process of milking. Tuberculosis in cattle is a grave source of danger and a potent cause of tuberculous infection in infants. Bacterial contamination during or after milking may come from the udders of the animal by means of hairs, dirt, animal excreta *et cetera*, from dust borne by the air, from the hands of the milkers or from the milking vessels. The two last-named sources are the most dangerous. Subsequent to milking the temperature at which the milk is stored and sent on its journey to the place of consumption is important. Milk forms an excellent medium for the cultvation of many pathogenic organisms.

It has been found from experience that when careful attention is paid to the maintenance of cleanliness in the milking sheds, to the personal cleanliness of the milkers and to the efficient sterilization of milking utensils, bacterial contamination can be reduced to a very large extent. Subsequent cooling or Pasteurization followed by cooling is then required in order to keep the milk in an hygienic condition until it can be consumed. Attempts have been made in different parts of the world to secure a safe milk supply by means of regulations and departmental enactments and by the individual initiative of dairymen and societies. Standards have been laid down and more or less rigid adherence to these standards has been required. In all attempts at statutory control several important considerations should be borne in mind. In the first place the conditions imposed must not be of such a complicated nature that the price of milk to the consumer will be materially raised. Milk is in such demand and is so necessary to the welfare of the community that regulations with complicated machinery would be the means of defeating their own ends. A second point of importance in milk legislation is the avoidance of arbitrary standards in regard to composition. The composition of good milk varies to the extent of 50% either way in the percentage of its constituents. The effect of arbitrary legislation in this regard is well exemplified in the standards laid down in the Commonwealth of Australia in an attempt to determine the composition of infants' food. The question of control is also of importance. Laws are useless unless steps are taken to see that they are obeyed. For this reason there must be undivided control. Supervision must be extended to every stage of the production of the milk supply, from cow to consumer. The process of introduction of these measures must necessarily be gradual, for the introduction of regulations alone is not sufficient. The producers have to be instructed and educated both in the principles and practice of hygienic milking.

On January 22, 1924, a series of regulations was gazetted under the *Milk Supply Act* of Victoria. This *Act* was placed on the statute-book only as a result of continual pressure from persons who were filled with enthusiasm and actuated by hygienic motives. The regulations were published in our issue of February 16, 1924. Perusal of these regulations will reveal that cooling of the milk to 4.5° Centigrade or 40° Fahrenheit is required. An exception to this rule is made when the farmer produces milk for sale within the metropolitan area and sells direct to the consumer within a period of two hours of the time of production. No raw milk containing more than two million organisms per

cubic centimetre is to be received by any dairyman within the metropolitan area. No Pasteurized milk is to be sold within the metropolitan area which contains more than 500,000 organisms per cubic centimetre. The Victorian *Milk Supply Act* is a big advance in the right direction and may well be a source of satisfaction to those whose continuous efforts have been largely instrumental in producing it. The effectiveness of the regulations, however, will depend on the method of administration and the degree of patient educational control that is exercised in their introduction.

## Current Comment.

### THE APPLIED PHYSIOLOGY OF THE THYREOID GLAND.

IT is in some ways the misfortune of physiology that she is constrained to serve the wants of medicine and surgery. No sooner has a partial discovery been made in the field of pure science than some clinician seizes upon it and appropriates it to his own use. Were it a case of pure felony, the servant would not upbraid his master. But the physiologists maintain, with some cause, that the clinicians are not mere pilferers, but perverters of the truth as well. Not long ago a distinguished physiologist was moved to mingled indignation and laughter in a review of the immense literature devoted to endocrinology. He pointed out that the known facts relative to the glands of internal secretion were few, yet many physicians with more of a philosophical than a scientific bent had applied the incomplete data of physiology to the elucidation of some of the most profound problems of the body. Wherever they found a hiatus, they filled the gap with the products of a fertile imagination. The vagatonia of Napoleon was contrasted with the sympaticotonia of St. Peter. The blessed word "adrenalinæmia" accounted for fear. The next step was obvious. Cowardice and courage could be explained away. There would be no free will and the very secrets of the soul would be unravelled to the strains of an hormonic melody.

However true this criticism may be, it cannot be said to apply to orthodox physicians. The smaller patrons of heterodoxy may be tossed about by every wind of doctrine, but those made of sterner stuff stand firm. Moreover, we know that many of the fundamental discoveries of physiology were made by men who were primarily devoted to medicine.

It is opportune to apply the above remarks to the disease-processes affecting the thyreoid glands. Our knowledge of the functions of the thyreoid body dates from the year 1874, when William Gull published his study on "A Cretinoid State Supervening in Adult Life in Women." Since that date the diagnosis of myxœdema, endemic cretinism and endemic goître has advanced almost to perfection and a brilliant therapeutic system has been brought to bear on these conditions, mainly as the result of clinical observation and experimentation. One disease of the thyreoid glands remains, however, unconquered. Physiologists, pathologists, physicians and surgeons have all tried to elucidate the mysteries of exophthalmic goître. In many essential points they have seemed to work at cross purposes. An observer who visited the recent Australasian Medical Congress (British Medical Association) in Melbourne, might well be pardoned if he came away with the impression that the surgeons had solved the riddle and that surgery and surgery alone could cure exophthalmic goître. Yet there are many not yet convinced that the knife is the ideal or most practical remedy for this condition. The excision of the thyreoid for Graves's disease is performed on the assumption that the condition is dependent on a pathological anomaly of that gland alone. This assumption is not completely justified, since much evidence has been advanced to prove that the gross changes in the thyreoid gland are merely a part of the morbid alteration of many glands of internal secretion.

The rational basis of investigation of the more complex disease processes affecting the thyreoid gland would appear to lie in an orderly correlation between physiological and clinical observation. Dr. David Marine[1] apparently had this end in view in a lecture which he delivered recently at the University of Pittsburg. He pointed out that the major function of the gland was to provide a means for maintaining a higher rate of metabolism than would otherwise exist and for varying this rate according to physiological needs. That the thyreoid gland provides a hormone for varying the rate of heat production may be demonstrated in several ways. Thus sufficient but sublethal injury to the suprarenal glands of many animals causes a definite lasting increase in heat production, provided the thyreoid gland is intact. This increase is not manifested if the thyreoid gland is excised prior to the suprarenal insult. Secondly, in mammals a definite rise in heat production occurs during pregnancy and lactation, but is abolished or greatly reduced after thyreoidectomy. In the third place, as was shown by Magnus-Levy in 1895, the administration of thyreoid gland causes a striking increase in metabolism. Lastly, thyreoidectomy decreases heat production.

For many years the means whereby the thyreoid gland controlled the metabolic rate was unknown. Baumann demonstrated in 1895 that iodine was a normal constituent of the gland, but only in recent years has it been recognized beyond doubt that the thyreoid control of metabolism is exerted by means of the very stable hormone containing iodine, which Kendall isolated in a crystalline form in 1916 and named by him "thyroxin." Stored in the colloid

[1] *Archives of Internal Medicine*, December, 1923.

material of the alveoli in variable amounts, this hormone is intimately associated with the globulin of the colloid from which it is separated only by destructive hydrolysis. The colloid acts, so to speak, as a granary for hormone. When the iodine store of the normal human thyreoid gland is measured, it is found to contain about twenty-five milligrammes by weight or approximately one milligramme in each gramme of fresh gland. The administration of iodine in any manner causes the store to be increased to the maximum. The activity of the gland is controlled chemically through the blood stream, but perhaps indirectly also through the sympathetic nervous system. Increase in thyreoid activity manifested by enlargement or hyperplasia (goître) occurs at puberty, during pregnancy and lactation, at the menopause, during protracted febrile states (*exempli gratia* tuberculosis and syphilis) and, as was pointed out by McCarrison, after the prolonged use of diets rich in proteins and fats. Associated with this increased activity is a decrease in the iodine store and if the latter falls below 0.1%, thyreoid enlargement begins. The iodine store bears an inverse relationship to the degree of active hyperplasia.

Dr. Marine quotes the classical experiment of Halsted who as far back as 1889 produced experimental goître in dogs. Halsted observed that the puppies of mothers from which the greater part of the thyreoid gland had been removed were born with enlarged, actively hyperplastic glands, frequently twenty times the normal size. Dr. Marine has carried these observations further afield. To cats and dogs which had been subjected to sub-total thyreoidectomy he administered during pregnancy a few milligrammes of iodine and found that the young were born with thyreoid glands normal in weight, histological structure and iodine content.

When the iodine store falls below a certain level, the cells of the thyreoid undergo hypertrophy and this hypertrophy is followed by hyperplasia. After a time the hyperplasia is replaced either by an atrophy of the gland due to exhaustion or by physiological recovery. By recovery is not meant a disappearance of the goître, but a return to the colloid or resting stage. The colloid gland is the condition nearest to normal, both anatomically and chemically, that the gland can assume once it has been in a state of hyperplastic activity. The cycle of hypertrophy, hyperplasia and involution either to an atrophic or colloid state may be repeated many times in dogs. The various progressive, regressive, degenerative, inflammatory and neoplastic changes occurring in the long-standing goîtres of man are merely examples of this experimental principle, as was pointed out by Virchow in the last century.

The physiological principles thus enunciated are applied by the author in a capable manner to the study of simple goître, cretinism and myxœdema. Thus simple goître is regarded as the local sign or effect of a specific deficiency disease resulting from one of three causes. The cause may be the increased need of the organism for the iodine-containing hormone. The cause may be an interference with the absorption and utilization of a normal intake of iodine, or lastly, it may be an actual deprivation of iodine, either natural or experimental. The author denies any supporting evidence to the theory that goître is a water-borne infection. Though holding the view that it is a compensatory hyperplasia immediately dependent on a deficiency of iodine, he grants the possibility that endemic goître may be due to some chemical agent or toxin which acts by diverting the normal intake of iodine or by increasing the needs of the organism for thyreoid activity. The conception of goître as a deficiency disease is supported by the fact that endemic goître may be prevented by the administration of the syrup of hydriodic acid. The curative treatment of goître is much less satisfactory. Though the results of iodine therapy are most striking in the early stages of the infection, the later development of adenomata, cyst formation, hæmorrhages into the gland and other pathological complications render medicinal treatment of little avail.

The author studies cretinism and myxœdema along similar lines. Thus infantile myxœdema or cretinism is regarded as the end stage of a definite functional insufficiency of the thyreoid gland, goître being the first evidence of this insufficiency. Morel expressed the same view very clearly sixty years ago when he wrote: "*Le goître est la première étape sur le chemin qui conduit du crétinisme.*" Cretinism may occur in the first generation of goîtrous parents, but it usually appears in the later progeny of several generations of goîtrous progenitors. Gull's disease, the myxœdema of adults, is commonly associated with atrophy or exhaustion of the thyreoid gland, though occasionally enlargement of the gland may be observed. Exophthalmic goître is the most important antecedent of myxœdema. Rarely, when abundant active gland is present, iodine is as efficacious in treatment as dessicated gland, a remark which applies with equal truth to congenital myxœdema. In all other cases the iodine-containing hormone must be supplied, for practical purposes in the form of dessicated thyreoid gland.

So far Dr. Marine has progressed admirably in his attempt to coordinate experiment with clinical observation. But when he comes to the consideration of exophthalmic goître, he is confronted with a problem which even his astuteness cannot surmount. This failure is, after all, to be expected. The enlargement of the thyreoid gland plays only one part in the complex drama of Graves's disease. There is evidence that the thymus, the liver, the sex-glands and the suprarenal cortex and medulla are involved in the pathology of this mysterious affection. The only suggestion of any value which he adduces is that the increase in metabolism is probably the result of accelerated thyreoid activity induced by the removal of the inhibitory influence normally exercised by the critical portions of the adrenal glands. Dr. Marine is apparently gripped by the fear lest he flounder in the mire. The apologists for many theories of this obscure disease are legion. Only by patient experimentation and non-partisan observation will any light be focussed on the problem.

# Abstracts from Current Medical Literature.

## THERAPEUTICS.

### The Bacteriophage in the Treatment of Infections.

EARL B. MCKINLEY (*Archives of Internal Medicine*, December 15, 1923) has reported his results in the treatment of infections with the bacteriophage. D'Herelle isolated the bacteriophage in 1917 in the stools of patients convalescent from dysentery. The filtrates from both cultures of these stools exhibited an interesting phenomenon. When added in amounts varying from two drops to two cubic centimetres to young broth cultures of *Bacillus dysenteriæ* (Shiga), it was found that the bacterial suspensions became limpid after a few hours in the incubator and were as clear as water. When agar slant sub-cultures were made from these tubes and incubated for several hours, there was found either a sterile slant (a pure culture of the bacteriophage) or multiple, minute clear round areas in which no bacteria grew. These latter were called by d'Herelle "colonies" of bacteriophages. This lytic substance could be transplanted to other young broth suspensions of Shiga's dysentery bacilli and the phenomenon would again be repeated. A "substance" was thus isolated from the intestinal tract of man which possessed the property of dissolving bacteria and which grew or increased at the expense of the bacteria, the organisms being completely destroyed so that not a fragment remained. D'Herelle believe that this lytic substance is a living organism which "parasitizes" and dissolves bacteria. He maintains that in disease there is a conflict between the infecting organism and the bacteriophage and that the disease has a fatal issue when the bacteriophage cannot adapt itself to the infecting organism or when the pathogenic organism acquires a strong resistance to the bacteriophage. In various forms of dysentery, in pyelo-nephritis due to *Bacillus coli*, in enteric fever and in rats harbouring *Bacillus pestis*, he succeeded in isolating the bacteriophage which was lytic for the infecting organism in question. The author has administered the bacteriophage by subcutaneous injection, by duodenal tube, into wounds, on dressings, by ureteral catheter, intra-nasally and by ingestion in amounts varying from one cubic centimetre to fifty cubic centimetres. He insists that it is harmless, as was shown by Davison when he administered thirteen hundred cubic centimetres without ill-effects. The patients treated suffered from staphylococcal pyelitis, septic wounds, osteo-myelitis, pulmonary abscess drained through an empyema wound, infected compound fracture of tibia and fibula and dysentery of the Flexner type. Bacteriophage cultures were injected in sterile atomizers into the nose of patients with sinus infections. In all instances the improvement in general condition and in the local purulent exudate was considerable.

### Administration of Red Bone Marrow.

C. D. LEAKE AND E. W. LEAKE (*Journal of Pharmacology and Experimental Therapeutics*, September, 1923) published the results of feeding rabbits and dogs on red bone marrow and splenic extracts. Variations in the red and white cell counts were found to follow the administration. A blood count was made and the hæmoglobin content noted; extracts of red bone marrow and of spleen pulp were injected into the ear veins of the animals and the animals were also given similar extracts by mouth. It was found that following the administration of splenic extract there was a fall followed by a rise in the number of erythrocytes. After three daily injections the count fell to normal in five days. The injections of red bone marrow caused a similar rise in the number of red cells. The hæmoglobin did not increase. Combined administration by injection and by the mouth gave similar results. The authors think that these results were due to stimulation of the erythrogenic centres and to extension of functionating red marrow.

### Hexamine Not a Diuretic.

B. SAAD (*La Presse Médicale*, June 27, 1923) has ranged his forces beside Cheinisse who has denied the view that hexamine has diuretic properties. Arnozan and Mongour led the assault in 1912 when they asserted that the diuretic effects and litholytic action of the drug were contestable. Early this year Cheinisse asked whether the high doses of hexamine, theoretically capable of augmenting diuresis, might not by their harmful effects on the kidneys lead on the contrary to a diminution of diuresis. Recent American authors have also held this view. Saad cites four instances in support of his view. In two the administration of 1.5 grammes caused complete suppression of urine. The same result occurred in a third instance when only one gramme was administered. In the fourth instance (the patient was a medical student suffering from staphylococcal pyuria) a dose of 1.5 to 2 grammes caused urinary diminution during one period and no effect on the output during another. The author states that the inhibitory action of hexamine is a transitory phenomenon of undetermined causation. It is possible that it may be of toxic or of sympathetic or of parasympathetic origin.

### Pilocarpine.

A. CAIN AND P. OURY (*La Presse Médicale*, October 27, 1923) discuss the rôle of pilocarpine in the treatment of retention of urine. They refer to four patients who suffered with retention due to reflex causes. One suffered from a tumour of the rectum, another with hemiplegia, a third with vesical crises of *tabes dorsalis* and the fourth presented a typical picture of a complete transverse lesion of the spinal cord. In all instances the retention either recurred or was of long duration and in all relief followed the subcutaneous injection of pilocarpine hydrochlorate or nitrate in doses corresponding to one centigramme of pilocarpine. Within eight or ten minutes of the injection the bladder was either evacuated rapidly or urine commenced to flow from the *meatus urinarius* slowly and the organ was emptied in one to two hours. The authors consider that pilocarpine must act in such instances on the motor fibres to the urethral sphincter, but they state that they cannot explain how it acts.

### Action of Sodium Bicarbonate on the Kidneys.

ELLIS KELLERT (*The American Journal of the Medical Sciences*, January, 1924) administered to apparently normal rabbits secreting normal urine intravenous injections of a 5% solution of sodium bicarbonate in quantities per kilogram in excess of those usually given to human subjects for therapeutic purposes. No injurious action resulted. In another series of rabbits suffering from nephritis induced by injections of potassium chromate, mercuric chloride and uranium nitrate, the similar use of sodium bicarbonate in equal or larger quantities resulted in no harmful action on the kidneys. The animals receiving the injections of the chemicals and sodium bicarbonate showed no greater renal changes than those receiving the chemicals alone. The author claims that there is therefore no experimental evidence, in the case of rabbits, for the belief that intravenous injections of sodium bicarbonate as used for therapeutic purposes, are injurious to the kidneys.

### Cardiac Dyspnœa.

C. WILSON (*The Lancet*, December 22, 1923) states his experiences of the use of opium in the treatment of dyspnœa due to heart disease. He divides cardiac dyspnœa into three types: (i.) The ordinary dyspnœa which occurs in all cases of heart failure and is aggravated by exertion; (ii.) cardiac asthma and (iii.) Cheyne-Stokes breathing. In the first mentioned variety opium may be of use to allay suffering and induce sleep, but it is in cardiac asthma and Cheyne-Stokes breathing that opium is most useful. In the two latter a hypodermic injection of morphine or "Omnopon" frequently causes a cessation of the paroxysm and induces sleep, the patient awaking without any dyspnœa and often remaining free from distress for some days. The doses employed varied from 0.01 gramme up to 0.06 gramme every four hours in a severe case. Morphine is often useful when Bright's disease complicates heart disease and the presence of mucus râles in the lungs is not a contra-indication to its use;

rather has it been found that the râles often disappeared after the administration of morphine. The author quotes a number of instances in which he had used this drug with benefit, the patients' ages varying between fifty-six and ninety-four. Old age is not a contra-indication. He holds that the value of this method of treatment is not sufficiently appreciated by practitioners and he points out that references to the use of morphine for the treatment of cardiac dyspnœa are few in the literature.

## UROLOGY

### Preliminary Ligation of the Renal Vessels in Nephrectomy.

D. N. EISENDRATH AND B. PORTIS (*Journal of Urology*, February, 1924) advise ligation of the renal pedicle by the abdominal method of approach before nephrectomy is attempted in two types of condition: (i.) When previous attempts to mobilize the kidney have been abandoned on account of hæmorrhage and a secondary nephrectomy is to be performed and (ii.) when primary nephrectomy is to be performed and severe bleeding is anticipated through the presence of fibrous perinephritis and also when difficulty in reaching the pedicle even by the subcapsular method is anticipated. Preliminary experiments were performed on dogs. Kidneys removed in the first week after ligation were swollen to twice their normal size and showed hæmorrhagic infarction. At the end of two weeks kidneys were still enlarged, but showed an almost complete disappearance of the normal structure. In addition there was commencing proliferation of fibroblasts in the capsular region. After four weeks the kidney was reduced to one-half the normal size and showed more complete replacement by connective tissue. Finally, at eight weeks the organ was only one-eighth its size and connective tissue had completely replaced the renal tissues. This tissue was comparatively avascular. The method was attempted in two patients. In the first, however, it was impossible to identify the vessels owing to the enormous thickening of the perinephritic tissues which extended over and completely enveloped the pedicle. The kidney was affected by advanced tuberculosis. Three previous attempts had been made to remove the organ by the lumbar route, but severe bleeding had forced the surgeons to discontinue. The second patient had had a large perinephritic abscess opened four weeks previously. He was in a very septic state from long standing suppuration around a calculous pyonephrosis. The renal vessels were ligated trans-peritoneally and twelve days later the kidney was removed by the lumbar route. There was no bleeding from the kidney or its pedicle. The results of microscopical examination coincided with the results obtained in the previous canine experiments. On the right side the posterior incision in the peritoneum is best made a little lateral to the border of the duodenum. On the left side the transverse colon with its meso-colon must be retracted upwards and the incision in the peritoneum made just lateral to the duodeno-jejunal junction. The surgeon must always search for and ligate accessory polar vessels.

### Bacteriostatic Action of Dyes.

J. W. CHURCHMAN (*Journal of Urology*, January, 1924) reports some experiments which he claims point to a selective effect of certain groups of dye on particular groups of organisms. The tri-phenyl-methane group of which gentian violet is taken as an easily obtained example, displays a strong bacteriostatic action on the great majority of organisms retaining the stains in the Gram method and, provided a certain concentration of the dye acts during a necessary minimum period, is not only bacteriostatic, but bactericidal. On the other hand acid fuchsin exerts a strong bacteriostatic action on most organisms which do not retain the stain in the Gram method. The action is not due to selective penetrability of the germs attacked, for *Bacillus anthracis* (retaining the stain) will grow readily even after taking up deeply the stain of acid fuchsin. Conversely, aerobic spores succumb readily to gentian violet, yet the dye penetrates little if at all. Thus it is established that the parallelism between the Gram and the gentian violet reaction does not depend on relative penetrability. An antiseptic of wide application might be made by mixing dyes. Gentian violet and acid fushcin will not mix, but gentian violet and neutral acriflavine will do so and the resulting mixture combines the selective features of the two dyes, being bactericidal towards all the common germs. In an attempt to achieve a *therapia sterilisans magna* in certain pyogenic infections of the genito-urinary tract due to organisms retaining the stain in the Gram method, gentian violet has been injected intravenously. For each forty-five kilograms of body weight twenty-three cubic centimetres of a 1% solution is injected. The dye has also been injected with encouraging results into infected joints and pleural cavities.

### The Use of Vaccines in Chronic Prostatitis.

L. P. PLAYER, R. LEE-BROWN AND C. P. MATHE (*Journal of Urology*, November, 1923) describe an instrument for collecting the secretion massaged from the prostate. With this instrument contamination from the urethera is avoided. The more important culture results obtained from samples from one hundred and eighteen patients were: Sterile fifty-seven, *Bacillus coli* twenty-four, *streptococcus hæmolyticus* associated with *Bacillus coli* thirteen, diphtheroids five, staphylococcus and *Bacillus coli* five. Autogenous vaccines were made from the cultured germs with an initial concentration of five hundred million in one cubic centimetre. The dosage was governed by the degree of local and focal reactions and injections were given every other day. The effect on the pus content was regarded as disappointing, while the effect on existent organisms was practically nil. Occasionally a temporary improvement occurred, but did not continue. The authors state that the failure of vaccines is not surprising in view of the usual histological picture. There is seen a cellular infiltration of the ducts and peri-glandular areas with increased connective tissue growth. The interest lies in the purulent exudate in the ducts and gland alveoli. Organisms lie scattered throughout this exudate and are well protected from the effect of antibodies circulating with the blood stream. Attention is drawn to the fact that in this series the gonococcus was not once identified in cultural examinations.

### Collargol Injection in the Vas Deferens.

J. BRAMS (*Journal of Urology*, November, 1923) has studied the after-effect of the injection of "Collargol" on the lumen of the *vas deferens* of large dogs. The injections were made by making a small nick with a razor edge and then introducing a fine curved and blunt-pointed needle. To avoid injuring the wall, a fine silkworm gut thread with first passed along the lumen. The needle was then passed along over the thread and the latter then withdrawn. With a syringe on the needle, two cubic centimetres of a 5% solution of "Collargol" were then slowly introduced. All oozing of "Collargol" back into the surrounding tissues was prevented. It was found that pathological changes occurred in the form of an intense inflammatory reaction with round-celled infiltration in the wall and much exudation into the lumen of the canal. These changes were more advanced near the injection site and at this point were also seen an exudation of fibrin and round cells. This exudation later became organized and led to the formation of fibrous adhesions between the vas and surrounding structures with consequent twisting and kinking of the vas at this point. The most noteworthy point was the proliferation of fibroblasts in the wall which took place about two weeks after the injection and led to a stricture obliterating the lumen at the end of five weeks. A control experiment was performed with the same technique, except that no "Collargol" was injected. The result showed that the trauma of operation alone was insufficient to cause a stricture.

# British Medical Association News.

## SCIENTIFIC.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Adelaide Street, Brisbane, on April 4, 1924, DR. V. MCDOWALL, the PRESIDENT-ELECT, in the chair.

### Death of Dr. Thomas Richard McKenna.

The CHAIRMAN made reference to the death of Dr. Thomas Richard McKenna and moved a vote of sympathy with his widow.

### Anæsthesia.

DR. A. P. MURPHY read a paper entitled "Ether and Ethyl Chloride" (see page 503).

DR. C. A. THELANDER read a paper entitled "Chloroform and Regional Anæsthesia" (see page 505).

DR. R. E. WEAVER read a paper entitled "The Intra-Tracheal Method of Ether Anæsthesia" (see page 506).

DR. W. N. ROBERTSON, C.B.E., considered that chloroform deaths were due to faulty administration. Little anxiety should be caused provided that it be properly given. Intra-tracheal anæsthesia was of great value in mouth and throat work—there was no risk of pus and blood getting into the trachea, especially with antral operations. It frequently obviated the necessity for tracheotomy. The main thing was to get the patient well anæsthetized.

DR. J. A. CAMERON asked Dr. Weaver whether the patient was kept at one depth of anæsthesia after the tube was in position. He endorsed Dr. Thelander's remarks regarding chloroform and always gave chloroform for induction before continuing with ether. The use of chloroform in general practice greatly outweighed that of ether when working single-handed or with inefficient help. He would like the opinion of the meeting regarding the use of morphine before narcosis. Atropine was beneficial, especially with children, but he considered that morphine was decidedly harmful. He was sceptical regarding the alleged pulmonary troubles following the use of either ether or chloroform. The inhalation of blood or foreign bodies might more reasonably be assumed as the cause of the trouble. Finally he referred to the apparent dread of Melbourne graduates to use chloroform.

DR. LILIAN COOPER stated that no mention had been made of Silk's mixture—one drachm of chloroform to four ounces of ether. This was particularly suited to dental anæsthesia. While on service in Macedonia she had found that the Serbians took ether very badly, but tolerated chloroform well.

DR. D. E. TRUMPY said that the fear of chloroform appeared to be ingrained in Melbourne graduates and was due mainly to the late coroner. For a routine anæsthesia he gave a preliminary injection of morphine and atropine followed by a sequence of ethyl-chloride and ether.

DR. G. W. MACARTNEY, D.S.O., considered that the coroner was not the only one to blame regarding the use of chloroform. Many surgeons refused to allow it to be administered. There was less vomiting after "closed" than "open" ether. If the anæsthetist gained the confidence of the patient before administering the anæsthetic, it would make a difference, not only as regards the induction, but also in the amount of post-operative vomiting. He referred to the universal use with good results of chloroform at the casualty clearing stations in France, even though most administrations had been given by orderlies.

DR. E. S. MEYERS pleaded for the appointment of specialist anæsthetists to the general hospitals. It would be good for the training of residents and also give the surgeons a wider choice of method of anæsthesia. He considered that ether was better than chloroform for obstetric conditions in which its use might be prolonged. Many of these patients with whom chloroform had been used, really died of shock. It was curious that there were not more deaths under dental anæsthesia from inspiration of blood. Gas and oxygen were not available at the Brisbane Hospitals. He had used both spinal anæsthesia with "Novocain" and the para-vertebral method of regional anæsthesia with good results.

DR. M. S. PATTERSON had always given a preliminary morphine injection of 0.015 gramme (grain one-quarter) for adult males and 0.01 gramme (grain one-sixth) for females and young children, but considered that the patients became more cyanosed and the breathing more troublesome. He preferred open ether with no preliminary injection. He was not very fond of chloroform-ether mixtures—the ether evaporated too quickly leaving too strong a concentration of chloroform on the mask. Ethyl-chloride was good for small operations and had a marked analgesic effect.

DR. A. V. MEEHAN considered that ether was safest for operations on the limbs. In children a preliminary injection of atropine abolished salivation.

DR. T. L. COONEY agreed with Dr. Cameron regarding the preliminary injection of morphine and atropine. A small amount of chloroform added to ether made an ideal anæsthetic for dental work.

DR. D. A. CAMERON did not agree with Dr. Macartney regarding the closed method of giving ether. It took some experience to use the Clover inhaler. He used 0.0075 gramme (grain one-eighth) of morphia together with atropine for preliminary medication followed by chloroform and open ether. Regarding intra-tracheal anæsthesia, he considered Lidwell's apparatus as good as the more complicated ones. The intra-pharyngeal method of anæsthesia seemed to be more useful and to be more in vogue than the intra-tracheal method. For children open ether was not satisfactory and he preferred a chloroform-ether mixture used in a Junker apparatus.

DR. GRAHAM BROWN said he wished at the outset to express his disappointment that no mention had been made in the programme of anoci-association or of nitrous oxide-oxygen analgesia. Dr. Weaver had stated that intra-tracheal anæsthesia was the latest method of administering anæsthetics. It was hardly conceivable that at such a meeting the work of such a man as Crile should get no mention. He (Dr. Graham Brown) considered that if any claim was made to recent advances in anæsthetic methods, anoci-association and nitrous oxide-oxygen analgesia deserved that honour.

Referring to ether anæsthesia, he considered that moderate doses of morphine should be given as a pre-narcosis.

There was one condition in throat work in which ether was absolutely barred and that was where there were peritonsillar or pharyngeal abscesses which were impossible to approach without an anæsthetic owing to a fixed lower jaw. He recounted instances where almost tragic consequences had followed the use of ether under such conditions. He objected to the use of ether where it could be avoided in patients who had any chronic bronchitis and in support of this he instanced his experiences in France during the first two years of the war. He had frequently induced chloroform anæsthesia.

Regarding ethyl chloride he wished to state that there was a pre- as well as a post-analgesic state. He recounted his own personal experience in that he had had a large carbuncle opened when he was in this pre-analgesic state without any feeling of pain. After this experience he had no compunction in not waiting until the patient was completely anæsthetized before incising a drum or even removing adenoids. He did not agree that a relaxed jaw indicated a great depth of anæsthesia. These experiences had been borne out by a considerable number of operations for removal of tonsils and adenoids in children. He did not desire a very deep anæsthesia and as soon as the mouth could be opened with moderate pressure of the gag he considered that the operation could be started. It must not be forgotten that there was an accumulative action of the drug and that the patient continued to become more deeply anæsthetized after the administration was stopped. It was essential, of course, for a surgeon to have an anæsthetist with whom he was accustomed to work in order to get the best results. No more anæsthetic should be given than was necessary for the work in hand.

He stated that chloroform was essential when using diathermy about the mouth and throat. He demonstrated the anæsthetizing spatula of Professor Sébileau, of Paris, and described that surgeon's method of using the instrument. Chloroform was used as a routine by Professor Sébileau and his methods had impressed Dr. Graham Brown very favourably.

Concerning intra-tracheal anæsthesia he detailed his experiences of such methods as he had recently seen in London with the use of the nitrous oxide-oxygen combination. He could only compliment the London anæsthetists who were using this anæsthetic and in his opinion it was the most suitable anæsthetic. It was given either by the intra-pharyngeal or intra-tracheal methods.

Concerning the use of local anæsthetics he gave details of his experiences over some years of block analgesia and had to confess that he had not during the last five years performed an antral operation except by this method. In this connexion he wished to give the details of the case of a man who died during the administration of cocaine some three months previously. The patient, aged fifty-six years, had been a sufferer from chronic rheumatism. He had taken a considerable amount of alcohol during his life, but latterly only a very moderate amount. During February, 1923, a left radical antrum operation had been performed by Dr. Graham Brown under block analgesia with satisfactory results. After Dr. Graham Brown's return from England in September he had found the right antrum to be affected and on October 2, using the same technique, the same solution and the same pre-narcosis, the patient after an injection in the infra-orbital region had immediately complained of pain in the right eye. This had rapidly been followed by pain in the right side of the chest, he had become pale and there had been Jacksonian movements of the right arm, there had been a conjugate deviation of the eyes to the right, the speech had become affected, the heart had stopped, but breathing had continued for some seconds, the pupils had been small (morphine had been given as a pre-narcosis). The patient had ceased breathing in about thirty seconds from the onset of the symptoms. Artificial respiration and massage of the heart through an abdominal incision had proved of no avail. A *post mortem* examination had been performed within three hours and had revealed a general sub-arachnoid hæmorrhage (due he considered to the convulsions). There had been no sign of any hæmorrhage in the brain. The heart which was fixed in systole, had been slightly smaller than normal, the coronary arteries about the thickness of a goose quill had only had a calibre of a pin's thickness. They had snapped easily between the fingers.

Dr. Graham Brown considered that a similar accident could easily have occurred during the administration of any anæsthetic, even with the use of urea and quinine. He had seen a similar type of convulsion during the intravenous administration of "Neo-salvarsan" and of quinine. He was of opinion that what had happened was that an abnormally large vein had been entered and that the cocaine solution had been injected directly into the circulation and produced death by its acute action upon the heart.

The condition had not resembled in any way cocaine poisoning in the pharmacopœal sense. Considering that the case had been commented upon by several members of the profession, he had described it in detail so that it would not be put down as a case of death from cocaine poisoning and also in order to give more confidence to local gentlemen who were using the methods of block analgesia than they might have without knowing the details.

Dr. Graham Brown said that he almost always used a 1% solution of cocaine, but never except in conjunction with morphine. Even instances of slight toxæmia were the rare exceptions in his practice. He used injections of quinine and urea at the end of the operations, especially in enucleation of the tonsils.

DR. A. P. MURPHY in replying stated that gas and oxygen had not been mentioned because they did not come within the scope of his paper. From figures he had obtained it cost twenty-five shillings an hour for its administration and so it was excluded from general use in most public hospitals. He had mentioned the analgesic effect of ethyl-chloride in his paper. Regarding the difficulty of opening the jaws when ethyl-chloride was used prior to ether, he found that this was always considerable unless the patient was well under the anæsthetic. Morphine had a depressent action on the heart and this was not counteracted by atropine. The re-breathing seen in the closed ether method caused salivation and had to do with post-operative vomiting.

DR. C. A. THELANDER considered that only as much anæsthetic should be given as was required for a particular operation. He would like to know what was the youngest age at which the intra-tracheal or the intra-pharyngeal method could be used. He considered that a specialist in anæsthesia was a failure from the teaching viewpoint. He tended to stick to one machine or method and required special surroundings. His paper was a plea for the proper teaching of chloroform anæsthesia. Chloroform deaths occurred mainly with those who only occasionally used it. The rules for the administration of chloroform and ether were quite different. He did not approve of chloroform-ether mixtures. If chloroform was not being taken well it was useful to have ether at hand. A little ether poured on the mask had a good effect. He preferred "Novocain" for local anæsthesia. His only experience with block anæsthesia was the injection of the *foramen ovale* for trigeminal neuralgia. Finally, he considered that the relative proportion of the fees paid to the anæsthetist and the assistant at an operation required readjustment—with more consideration for the former.

DR. R. E. WEAVER stated that the intra-pharyngeal method of anæsthesia, was sufficient except in those cases in which the air passages might be inundated with blood. When the patient was anæsthetized and the instrument set, it was difficult to state what percentage the patient was receiving. He required 10% of ether vapour. There was no need to alter for the first hour, then less ether and more air could be given. He had not used the intra-tracheal method before the eighth year. Any damage done to the soft parts was due to inexpert administration.

### Enlarged Cervical Glands.

DR. R. GRAHAM BROWN demonstrated a woman, aged sixty-two, whom he had shown at the previous meeting of the Association. At that time she had had multiple enlarged glands of the neck, carotid and sub-occipital regions.

Two years previously she had had grossly enlarged tonsils and lingual tonsils removed for obstruction to respiration and swallowing. Microscopical examination had revealed the condition to be purely simple hypertrophy. There had been a recurrence of the tumour formation at the left inferior tonsillar region.

Dr. Graham Brown had promised to show the patient after she had had X-ray treatment. Three weeks previously Dr. Val MacDowall had given her one application of X-rays with, as the condition showed, amazing results. There was no enlarged glands whatsoever to be felt and the tumour formation in the lingual region had almost disappeared. As this condition had been diagnosed by three gentlemen in consultation as "inoperable cancer," Dr. Graham Brown considered that it was very unfair, to say the least of it, to make such a diagnosis without at first making a microscopical examination.

## MEDICO-POLITICAL.

A MEETING OF THE SOUTH-WESTERN DIVISION OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Hamilton on March 20, 1924, DR. H. I. HOLMES, the PRESIDENT, in the chair.

### Letters of Thanks in the Press.

It was decided to ask the Council of the Branch to circularize the press in the District generally with regard to the insertion of laudatory notices.

### Country Laboratories.

It was decided to ask the Commonwealth Health Department to establish branch laboratories at Hamilton and Warrnambool, to ask committees of public hospitals in these towns to provide suitable room accommodation for these laboratories and to ask the State Health Department to use these laboratories, if established, for public health work and to subsidize them accordingly.

### Country Business at Branch Council Meetings.

It was decided to ask that business affecting country "divisions" be as far as possible concentrated and restricted to certain Council meetings to which the representatives of the country "divisions" would be specially summoned.

### National Insurance.

It was decided to ask Dr. Newman Morris to visit the "Division" and address the members on the subject of national insurance at a meeting to be held at Warrnambool early in April.

### Infectious Diseases.

Members had the privilege of listening to an address by DR. F. V. SCHOLES on some practical points in the diagnosis and treatment of infectious diseases. A brisk discussion followed.

## NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

CASTLEDEN, ELSIE MARION, M.B., 1924 (Univ. Sydney), 52, Perkins Street, Newcastle.
DENNEEN, MAYNARD SCOT, M.B., Ch.M., 1924 (Univ. Sydney), Fisher Avenue, Vaucluse.
HORN, LOUIS JULIUS, M.B., Ch.M., 1923 (Univ. Sydney), c.o. Mr. E. A. Hellyer, I.O.O.F. Temple, 140, Elizabeth Street, Sydney.
PEARSON, HENRY ROY, M.B., Ch.M., 1924 (Univ. Sydney), Middleton Street, Stanmore.
RILEY, BASIL WILLIAM BIRKENHEAD, M.B., Ch.M., 1923 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.

THE undermentioned have been elected members of the Queensland Branch of the British Medical Association:

FLYNN, THOMAS JOSEPH, M.B., Ch.M., 1922 (Univ. Sydney), Ipswich.
LYNCH, ALBAN JOSEPH, M.B., Ch.M., 1923 (Univ. Sydney), Brisbane.
RYAN, WILLIAM DENNIS, M.B., Ch.M., 1921 (Univ. Sydney), Barcaldine.

# Medical Societies.

## THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the Adelaide University on December 7, 1923.

### "Insulin."

PROFESSOR T. BRAILSFORD ROBERTSON and MR. MARSTON demonstrated the methods employed in the manufacture of "Insulin." DR. W. RAY and DR. C. T. TURNER drew attention to the possibility of important errors of dosage due to inaccuracies in the syringe method employed for injection. Dr. Ray drew attention to Dreyer's method of delivering fixed amounts of solution.

Dr. W. Ray also reported that in a number of patients at the Adelaide Hospital he had observed that the excretion threshold for glucose increased enormously as the result of administering "Insulin." He had observed blood sugar as high as 0.2% to 0.26% without appearance of any sugar in the urine. Subsequently the blood sugar had come down. In some instances upon initiation of treatment with "Insulin" the blood sugar had gone up and sometimes had come down. No correlation had been observed between the behaviour of blood sugar and the degree of acidosis. He also drew attention to the extraordinarily low intake of calories found to be sufficient for bed patients suffering from diabetes. It was not unusual to find patients subsisting upon an intake of 1,300 to 1,350 calories without losing weight. An intake of 2,000 calories was often felt by the patient to be intolerably excessive.

### Innervation of Muscle.

DR. O. W. TIEGS exhibited a preparation of the peculiar nerve ending on the muscle fibre of the crab's claw and pointed out that it constituted further evidence that the two spirals found in muscle fibres exert opposing actions. Each of the muscle fibres was provided with two nerves, one ending on the one spiral, the other on the second. Stimulation of one nerve fibre brought about a state of constant (not tetanic) contraction and such contraction could only be inhibited by stimulation of the other nerve. In other words the two spirals which were innervated by these two nerves, must have opposing actions. Since one of the spirals was known to liberate lactic acid during excitation, it followed that the other must liberate a basic substance, the nature of which had not yet been discovered.

### Rinderpest.

DR. BULL gave an account of the present knowledge of rinderpest. He stated that cattle plague or oriental rinderpest was an acute febrile contagious and infectious disease of cattle caused by a filter-passing micro-organism and that it ran a typical course. It was also characterized by a croupous diphtheritic inflammation of the mucous membrances.

It had been known since the early ages not only in Asia but also in Europe. Its infectious nature had been recognized early and established by successful inoculations by Dodson in 1744. The causative agent had remained unknown until Nicolle and Adit-Bey established its filterability through porcelain filters in 1902.

Rinderpest caused enormous losses in cattle and might even result in almost complete extinction of animals in large territories. Sometimes it might also cause considerable losses among flocks of sheep and goats. In the first two decades of the eighteenth century it had existed throughout Europe with such intensity that, for instance, from 1711 to 1714 one and a half million cattle had fallen victims to it. Later Holland had lost almost its entire stock of cattle as a result of the disease. The losses in Germany during the eighteenth century were estimated at thirty million cattle.

The contagion was present during the entire disease in all tissue fluids. As small a quantity as 0.001 gramme of blood taken at the height of the disease and injected subcutaneously into a full grown animal would produce the disease. Besides the tissue fluids the virus was present in the different secretions—saliva, nasal discharge, urine, fæces, bile, tears, vaginal discharge, sweat, while the infectiousness of exhaled air was doubtful. Infection was readily accomplished by subcutaneous injection or by feeding infective material, while by intravenous injections infection was only an exceptional result. Besides cattle and buffaloes, sheep and goats as well as camels might be infected by subcutaneous injections, while infection was less certainly transmitted by feeding infectious material.

In spite of Theiler's failure to produce the disease in hogs, it was generally admitted that these animals were susceptible and they were used for diagnostic purposes.

Blood or other infective fluids sealed in a glass tube remained virulent for several months. According to old observations the virus remained virulent on hay kept from direct sunlight for from three to four months. It was easily destroyed by heat and ordinary disinfectants. It

was not glycerine resistant, but was not destroyed by 0.5% carbolic acid. Shilston in 1919, working in India, found that in buildings and on areas infected by natural discharges the virus was unable to survive for more than two or three days and that when air and sunlight were freely admitted its destruction was even more rapid. Carcasses of animals which had died, must be regarded as possible sources of infection for some considerable time, as it had been shown that virus could survive for fifty-one days in blood even when freely exposed to air and allowed to become putrid.

Natural infection resulted either by direct contact or was transmitted through the raw products of affected animals as well as by persons contaminated by such. Food, drinking water, stable utensils, cloths *et cetera* might also transmit the infection. Usually infection was disseminated by affected animals in the ordinary traffic with cattle. Some animals might be only slightly affected and yet retain the virus in the body up to thirty days. The existence of carriers had not been definitely established, although such would be expected to occur. Infection usually occurred through the digestive tract. Buffaloes were usually susceptible. One attack of the disease usually abolished the susceptibility of the animal.

Animals dead of rinderpest were greatly emaciated. The most important changes appeared in the mucous membrane. In the mouth there were yellowish-grey nodules and granular pulpy deposits. The abomasum showed varied shadings from a brick-red to a dark-brown coloration. The mucous membrane was swollen and the submucosa thickened as the result of œdema. Later plate-like deposits of false membrane were observed with ulceration beneath. Small intestines showed similar changes. The solitary follicles formed small nodules from which caseous material might be squeezed. Peyer's patches were swollen and round them appeared dirty grey deposits which later confluated to a dry, caseous and strongly adherent or mush-like, soft deposit several millimetres in extent.

The large intestine might show similar changes, but usually less pronounced. Punctiform or linear hæmorrhages and catarrhal swelling with œdema of the submucosa were present in the nose and larynx. Frequently pseudo-membranous deposits were present.

The spleen was usually unchanged. Kidneys showed cloudy swelling. The heart was flabby, showed fatty degeneration and sub-pericardial and sub-endocardial hæmorrhages.

The incubation period extended from three to nine days, or slightly more. The first symptom was a rise of temperature with the usual manifestations. Many of the affected animals coughed frequently. From the second day inflammatory changes of the mucous membranes appeared. The conjunctivæ were bright red, lids were swollen with profuse epiphora. Nasal mucous membrane was reddened and there was a discharge from the nose. In the buccal mucous membrane hæmorrhages, pseudo-membranes and erosions occurred. Profuse diarrhœa set in after the second or third day. The continuous fever usually reached its height on the fifth or sixth day, the daily differences varying by one degree, and rapidly dropped with the onset of the diarrhœa in severe cases to below normal. If there was an indication of improvement, the fever subsided gradually. In some cases a vesicular eruption in the skin was observed. In the majority of severe cases the disease lasted on an average from four to seven days. In others the course might extend from fourteen to sixteen days. Mild forms were observed, in which case there was a febrile condition lasting for a few days and very slight catarrhal changes in the mucous membranes.

Dr. Bull said that rinderpest as a plague did not spread very rapidly in large herds. It might require five to six weeks for the disease to affect all the animals in a herd of fifteen to twenty animals.

The mortality fluctuated within wide limits, being as high as 90% in some cases and dropping as low as 15% to 20% in others.

Recovery from the disease afforded the animals an immunity lasting for a long time. The intensity of the immunity developed was relative to the severity of the affection. Various methods had been used to produce immunity in animals where the disease is enzootic. Immunization by using the bile of affected animals had been attempted. The results had not been satisfactory. The immunity obtained was usually of short duration, three to four weeks. At other times severe losses had resulted.

Immunization with blood serum from hyper-immunized animals had been used. The passive immunity thus conferred lasted for a very short time. This could be increased up to a point by using large quantities of serum. The method which had found most favour and had been used extensively in most countries where the disease was enzootic, was that known as the simultaneous method. This had been introduced by Kolle ad Turner and consisted of injecting the animals subcutaneously with one cubic centimetre of virulent blood and at the same time eight to twenty-five cubic centimetres of immune serum. Losses up to 1% might occur when the best methods were employed. As inoculated animals might transmit the disease to healthy animals, its application was only indicated in already infected territories.

DR. RAY pointed out that cases of a disease of the appendix had been observed (the so-called sago-grain disease) having a morbid anatomy similar to rinderpest.

DR. BULL explained that it was impossible to convey rinderpest directly into the blood stream and that this was also the case with pleuro-pneumonia. He stated that more than thirty diseases in men, animals and plants were known to be due to filterable viruses.

PROFESSOR T. B. CLELAND pointed out that in rinderpest there was a double rise of temperature which was also observed in dengue fever and in this case the second rise of temperature was certainly not due to any secondary infection.

# Correspondence.

## NATIONAL INSURANCE.

SIR: As it is almost certain that a national insurance act will come into operation in Australia, it is necessary for us to draw up a workable scheme with regard to medical benefits eliminating the disadvantages obvious in other *National Insurance Acts* in operation at the present time.

Unfortunately (according to my observation) the tendency of the general practitioner is to say simply that he rejects the act and will oppose its being brought into operation. He says that without the co-operation of the medical profesion the medical benefits cannot be enforced —and strictly speaking this is true—but the profession does not want to be involved in a strike without making some effort to obtain the conditions for which they are striking. If we blindly and stubbornly refuse to have anything to do with the act and it becomes law in spite of us, it becomes a much more difficult matter to change it then, than if we had previously submitted the conditions under which we would cooperate in a national insurance scheme. In any event constitutional means are always preferable to unconstitutional ones.

The matter is one that affects the general practitioner almost exclusively and this fact has not been sufficiently realized by the members of the British Medical Association (Australian Branch). The Committee on behalf of the Association dealing with this matter should consist wholly of general practitioners or at least of a majority of general practitioners. Specialists and others who were formerly in general practice cannot remember the exact conditions of general practice and in many instances the conditions have altered considerably. I urge the Council to give consideration to this matter.

The Committee should formulate a plan setting out the conditions under which they would be prepared to co-operate in a national insurance scheme. If the Govern-

ment would not accept those conditions, then the medical profession would at least know that they had done their best to meet the Government. Should more stringent opposition to the act be then necessary, the blame could not be attributable to us.

Most of the objectionable matters from the point of view of the general practitioner in the English *National Insurance Act* have been brought in by regulations passed under the *Act*. We would be able to guard against the recurrence of this by stipulating that all regulations affecting medical benefits or the medical profession shall be subject to the approval of a committee (appointed by the British Medical Association) of a stipulated number of general practitioners.

As examples of the grievances (some of which have driven the general practitioner to law) brought about by the regulations alone, I may cite: (i.) The charging of a doctor for so-called "extravagant prescribing"; (ii.) the onerous clerical duties insisted on in England.

We should demand adequate representation on all committees formed under the national insurance scheme. Surely three medical men on an advisory committee of eighty (as provided under the English *National Insurance Act*) cannot be called adequate.

Yours, etc.,

E. ROSANOVE, M.B., B.S.

75, Westgarth Street, Northcote,
April 21, 1924.

## Proceedings of the Australian Medical Boards.

### QUEENSLAND.

THE undermentioned have been registered, under the provisions of the *Medical Act of 1867*, as duly qualified medical practitioners:

JENKINS, ARCHIBALD, M.B., Ch.M., 1923 (Univ. Sydney), Mungana.

WAGNER, JOHN GEORGE, M.B., 1924 (Univ. Sydney), General Brisbane, Hospital.

WOODHEAD, JOSHUA NORMAN, M.B., 1924 (Univ. Sydney), General Hospital, Brisbane.

## Medical Appointments.

DR. C. D. KERR has been appointed Acting District Medical Officer and Public Vaccinator at Fremantle, Western Australia.

* * * *

DR. JOHN KENNY (B.M.A.) has been appointed Pearling Inspector for the port of Cossack, Western Australia.

## Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

ROYAL ALEXANDRA HOSPITAL FOR CHILDREN, SYDNEY: Honorary Assistant Ear, Nose and Throat Surgeon.

ROYAL HOSPITAL FOR WOMEN, SYDNEY: Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: (*a*) Honorary Medical Officer, Anti-Tuberculosis Dispensary; (*b*) Honorary Assistant Surgeon for Diseases of the Ear, Nose and Throat; (*c*) Two Clinical Assistants (Non-Resident).

## Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

| BRANCH. | APPOINTMENTS. |
|---|---|
| NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney | Australian Natives' Association<br>Ashfield and District Friendly Societies' Dispensary<br>Balmain United Friendly Society's Dispensary<br>Friendly Society Lodges at Casino<br>Leichhardt and Petersham Dispensary<br>Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney<br>Marrickville United Friendly Societies' Dispensary<br>North Sydney United Friendly Societies<br>People's Prudential Benefit Society<br>Phœnix Mutual Provident Society |
| VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne | All Institutes or Medical Dispensaries<br>Australian Prudential Association Proprietary, Limited<br>Mutual National Provident Club<br>National Provident Association |
| QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane | Brisbane United Friendly Society Institute<br>Stannary Hills Hospital |
| SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide | Contract Practice Appointments at Renmark<br>Contract Practice Appointments in South Australia |
| WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth | All Contract Practice Appointments in Western Australia |
| NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington | Friendly Society Lodges, Wellington, New Zealand |

## Diary for the Month.

MAY 27.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
MAY 29.—New South Wales Branch, B.M.A.: Branch.
MAY 29.—South Australian Branch, B.M.A.: Listerian Oration.
JUNE 4.—Victorian Branch, B.M.A.: Branch.
JUNE 6.—Queensland Branch, B.M.A.: Branch.
JUNE 10.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 11.—Melbourne Pædiatric Society.
JUNE 11.—Tasmanian Branch, B.M.A.: Branch.
JUNE 11.—Central Northern Medical Association, New South Wales.
JUNE 12.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 12.—Brisbane Hospital for Sick Children: Clinical Meeting.
JUNE 13.—Queensland Branch, B.M.A.: Council.
JUNE 13.—South Australian Branch, B.M.A.: Council.
JUNE 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

## Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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